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Davison purifies uranium, thorium by pulse-type solvent extraction . . . 32

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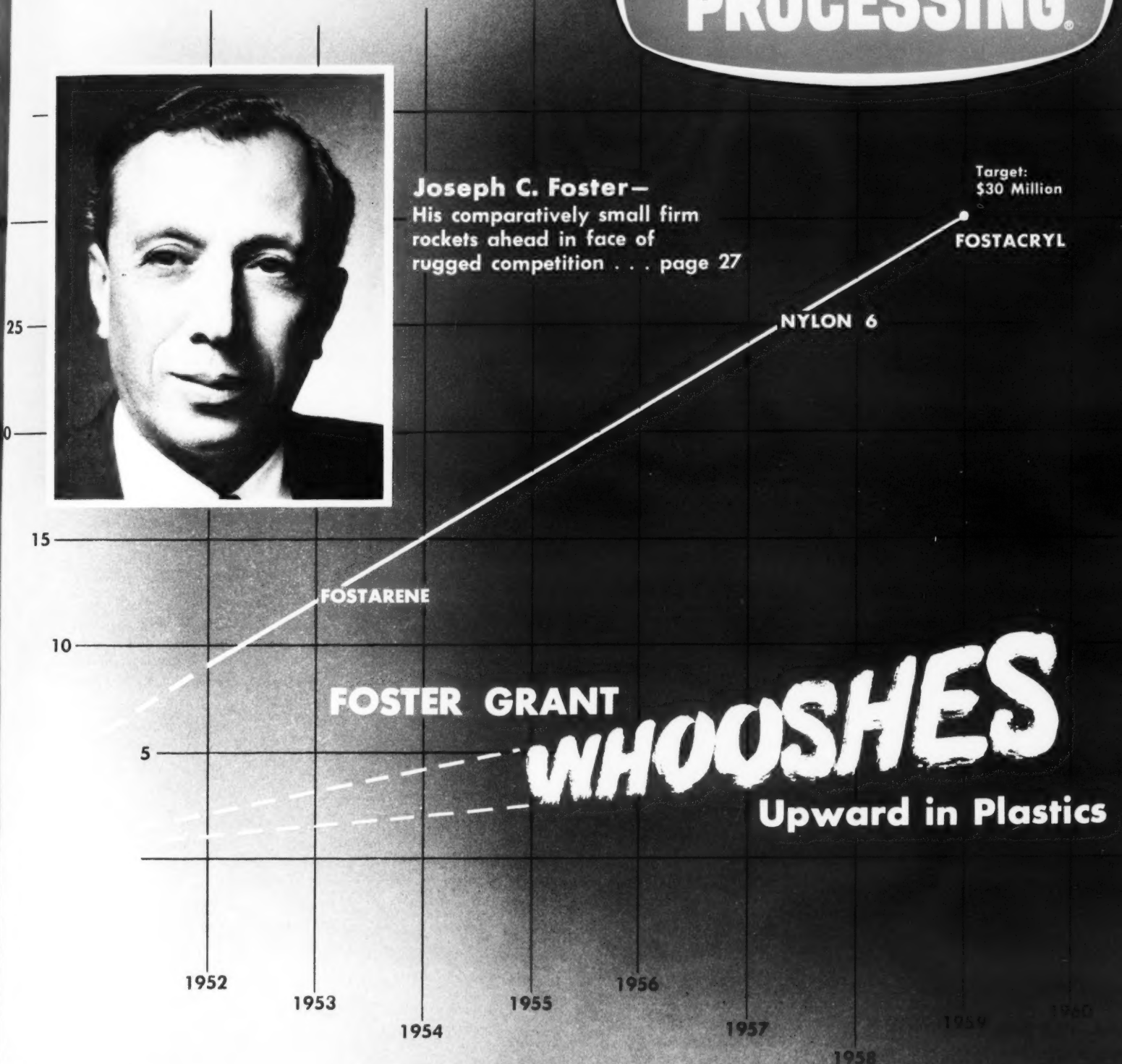
His comparatively small firm rockets ahead in face of rugged competition . . . page 27

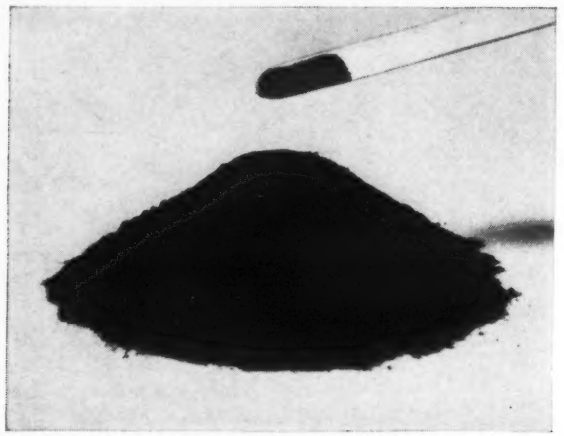


FOSTER GRANT WHOOSHES Upward in Plastics

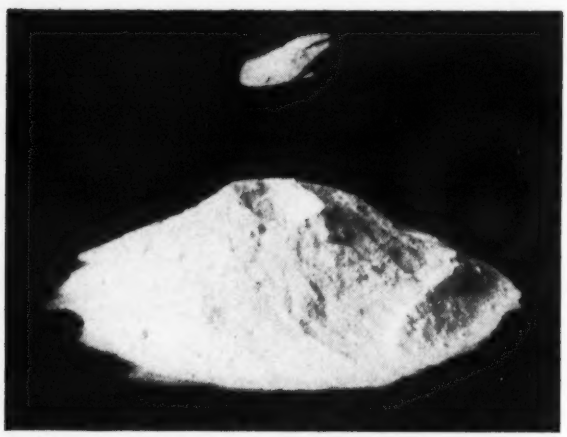
A PUTMAN PUBLICATION
"Executive Magazines for Industry"

4 B&A® ACETATES... *and some of their uses*

Ammonium acetate, crystal, purified, $NH_4C_2H_3O_2$. These are small, slightly moist, colorless to white crystals. They are very soluble in cold water and alcohol. Uses of this exceptionally pure, high quality product include the manufacture of foam rubber and vinyl plastic, the dyeing of fabrics, and applications in explosives and pharmaceuticals.



Cupric acetate, crystal, reagent and technical grades, $Cu(C_2H_3O_2)_2 \cdot H_2O$. B&A cupric acetate is of highest quality and purity . . . also easy to handle. Reagent grade is used in the manufacture of synthetic fibers . . . technical grade in the manufacture of dyes, copper mirrors and printed circuits.



Calcium acetate, powder, purified, $Ca(C_2H_3O_2)_2 \cdot H_2O$. This is a high quality, white, free-flowing powder made from carefully selected raw materials. It should not be confused with ordinary gray acetate of lime, over which it offers many advantages. Its uses include the liming of rosins, catalyst in preparation of metal resinates, and varied applications in pharmaceuticals and foods. It is also used in the petroleum industry for the preparation of calcium soaps.

Potassium acetate, N.F. and technical, $KC_2H_3O_2$. B&A potassium acetate may be used as a humectant in various industries, such as textiles and cigarette paper manufacture. It has varied uses in the pharmaceutical industry.

For further information on any of these or other acetates—or any application ideas you may have—just drop us a line on your company letterhead asking for technical data or samples. If you'd like technical assistance, we'll be glad to work with you.

BAKER & ADAMSON®
Fine Chemicals

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

Check 1000 opposite last page

conventions and exhibits

April 5-10. American Chemical Society, 135th National Meeting, Boston.

April 5-10. International Atomic Exposition, Public Auditorium, Cleveland.

April 10. American Institute of Chemical Engineers, Ohio, Pittsburgh, and Northern West Virginia Sections, Annual Joint One-day Symposium, Mellon Institute, Pittsburgh.

April 13-15. American Management Association, 28th National Packaging Exposition, International Amphitheatre, Chicago.

April 14-15. Institute of Radio Engineers and Armour Research Foundation, Industrial Instrumentation & Control Conference, Illinois Institute of Technology, Chicago.

April 20-22. The American Oil Chemists' Society, Spring Meeting, Roosevelt Hotel, New Orleans.

April 25-30. Scientific apparatus Makers Association, 41st Annual Meeting, The Greenbrier, White Sulphur Springs, West Virginia.

April 29-30. Manufacturing Chemists' Association, Symposium on Packaging and Transportation of Chemical Products, Engineering and Scientific Center, Cleveland.

May 3-7. The Electrochemical Society, Inc., meeting, Sheraton Hotel, Philadelphia.

May 6-8. American Institute of Chemists, Annual Meeting, Hotel Traymore, Atlantic City.

May 7. Armour Research Foundation and the Electrochemical Society, Corrosion Inhibitors Symposium, Illinois Institute of Technology, Chicago.

May 10-13. American Institute of Chemical Engineers, meeting, Kansas City, Mo.

May 14-23. International Petroleum Exposition, Tulsa, Oklahoma.

...Meetings and shows of interest to the chemical industries

May 17. American Society for Testing Materials, Seventh Meeting on Mass Spectrometry, Statler Hilton Hotel, Los Angeles.

June 1-5. Fifth World Petroleum Congress Exposition, Coliseum, New York.

June 2-4. Appalachian Underground Corrosion Short Course, University of West Virginia, Morgantown, West Virginia.

June 9-12. The Material Handling Institute's Exposition of 1959, Public Auditorium, Cleveland.

June 10-12. Instrument Society of America, Second International Symposium on Gas Chromatography, Kellogg Center for Continuing Education, E. Lansing, Mich.

June 15-19. Course on the Theory and Design of Biological Waste Treatment, Civil Engineering Dept., Manhattan College, Riverdale, New York.

June 22-24. American Society of Refrigerating Engineers, Annual Meeting, Lake Placid Club, Lake Placid, N.Y.

September 13-18. American Chemical Society, National Meeting, Atlantic City.

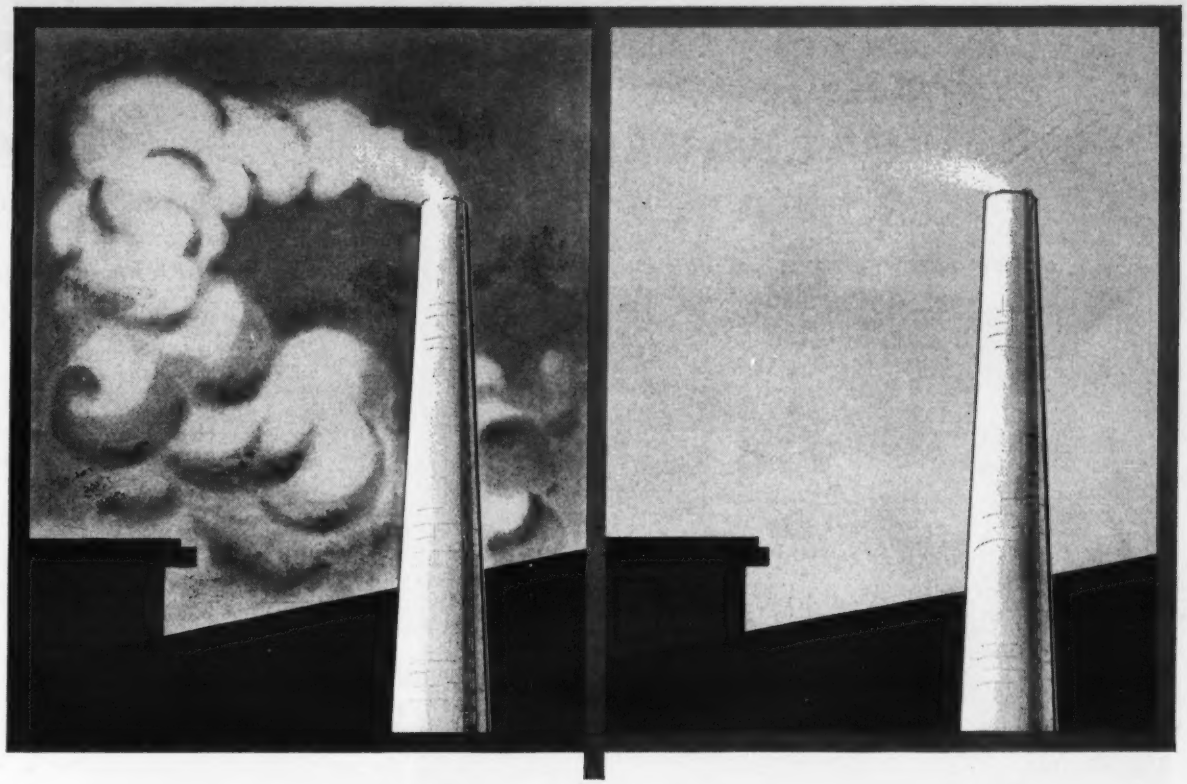
September 21-25. 14th Annual Instrument-Automation Conference and Exhibit, International Amphitheatre, Chicago.

September 27-30. American Institute of Chemical Engineers, meeting, St. Paul, Minnesota.

September 28-30. American Oil Chemists' Society, meeting, Hotel Statler, Los Angeles.

October 18-22. The Electrochemical Society, Inc., meeting, Deshler-Hilton Hotel, Columbus, Ohio.

October 20-24. Federation of Paint and Varnish Production Clubs, 37th Annual Meeting and the 24th Paint Industries' Show, Lower Hall of Convention Hall, Atlantic City.



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with a
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Dracco can be your most helpful ally in the fight against air pollution.

For over 40 years, Dracco has specialized in producing cloth filtration and cyclonic equipment for control of airborne particles. This includes a comprehensive variety of collectors and filters to solve any industrial dust or fume problem, large or small.

Today Dracco systems satisfy the toughest anti-pollution laws in many of the nation's largest metropolitan areas. In anticipation of even more stringent ordinances, Dracco research is developing advanced filtering media and radically new agglomeration and collection techniques.

You can take advantage of this know-how by consulting Dracco on your problems of producing your company's most important new product—*pure air!* The result will be a soundly engineered system that combines economy with reliable long-term service.

When you are ready to tackle that air pollution job, remember Dracco.

Multi-Bag Filter collects over ½ ton of dust daily at large eastern manufacturer, meets strict metropolitan air pollution requirements.

DRACCO DIVISION OF FULLER CO.
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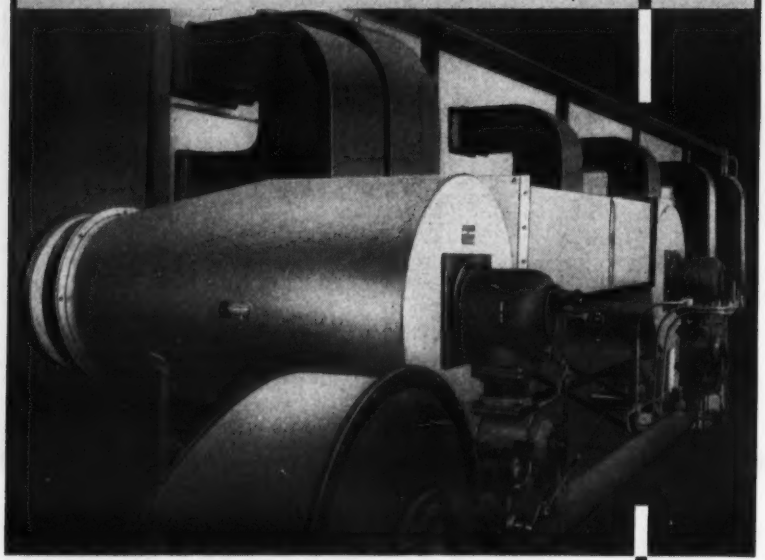
DRACCO *airstream* conveyors
dust control equipment
(Pronounced Dray'-co)

Check 1001 opposite last page

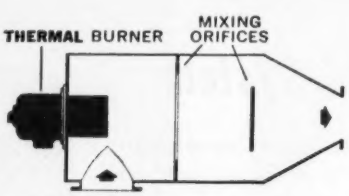
THERMAL'S PACKAGED AIR HEATERS

RATED OUTPUTS TO 20,000,000 BTU/hr



COMPACT...OIL OR GAS FIRED

Extremely versatile design permits the THERMAL Type CA heater to be used in a wide variety of installations and with either gas, oil or combination firing. Shown here is a tunnel dryer installation of the Edgar Plastic Kaolin Co., Edgar, Florida. THERMAL CA air heaters with #7028 burners provide 4,000,000 BTU/hr each using #2 fuel oil. These air heaters are equally adaptable to kilns, ovens, spray dryers and many other installations where products of combustion may be mixed with the air.



NO REFRACTORY REQUIRED

The CA air heater is built around the THERMAL high velocity burner. Because of its unique design, combustion takes place almost entirely within the burner. It normally requires no refractory and provides maximum utilization of available space.

THERMAL'S all-metal, welded construction keeps maintenance costs at a minimum. CA air heaters are supplied as complete "package" installations with outputs ranging from 200,000 BTU/hr to over 20,000,000 BTU/hr at all pressure levels.

WRITE FOR BULLETIN #104

OTHER THERMAL PRODUCTS & SERVICES

Gas, Oil & Combination Gas-Oil Burners • Heat Exchangers • Submerged Combustion • Combustion & Heat Transfer Engineering

THERMAL

Thermal Research & Engineering Corp.

CONSHOHOCKEN • PENNSYLVANIA

REPRESENTATIVES IN PRINCIPAL CITIES

Check 1002 opposite last page

CHEMICAL PROCESSING

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

For the management team

More than 50,000 copies of this issue

Vol. 22 April 1959 No. 4

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CHEMICAL PROCESSING serves members of the Management Team in these industries:

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Petroleum, coal, coke-oven products
Rubber products
Stone, clay & glass products
Atomic energy establishments

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over the editor's shoulder

Chemical Progress

Although "chemical progress" is a year round activity — again special emphasis is being placed on "Chemical Progress Week" during the week of April 13-17.

Everyone who has a stake in this important field of U. S. industry should do his bit to emphasize the significance and importance of chemistry and the products of chemistry in terms of the daily life of the individual.

Many themes are suggested for any local group that might be helpful to the layman in understanding some of the problems of the industry. Among these are:

Safety — special activities will highlight the fact that the industry is a safe place to work and that chemical plants are good neighbors in a community.

Science in the community — suggestions on how chemistry aids the community will be emphasized.

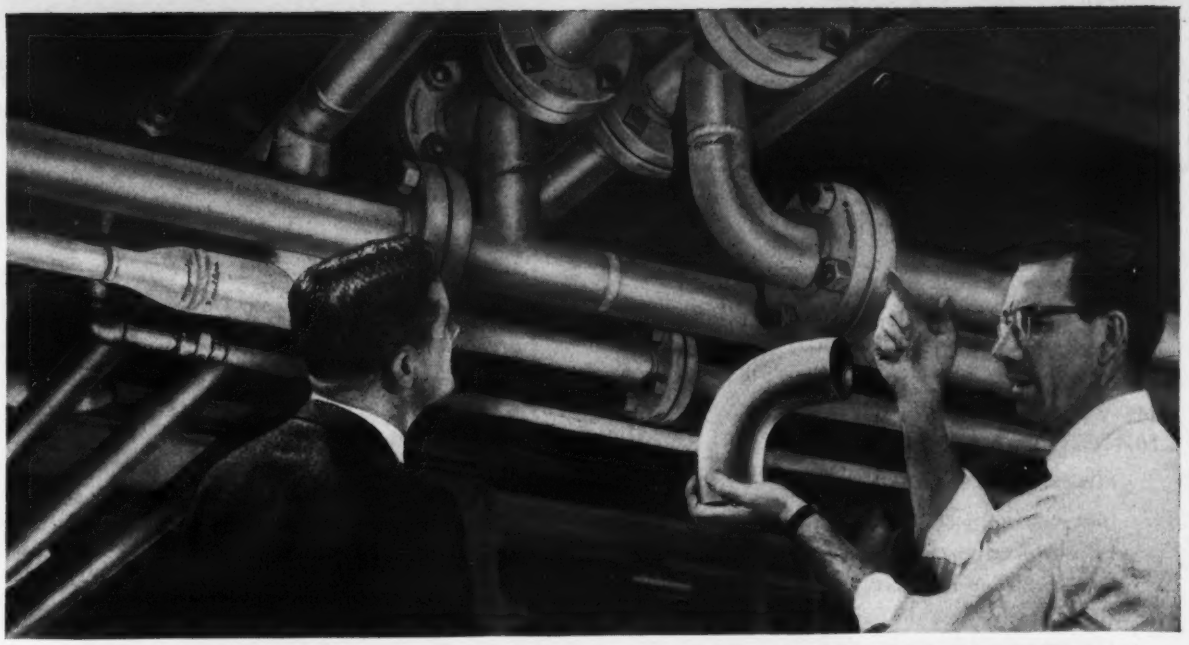
Distaff side — other special activities will inform women's groups on how chemistry makes living better, easier, longer.

New frontiers — special programs with school groups will acquaint teachers and students as well as other special audiences on the importance of chemical progress.

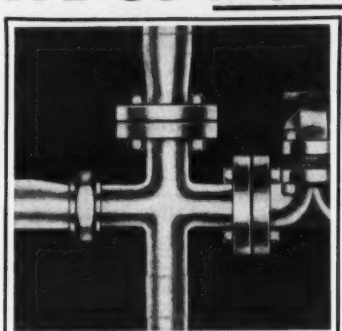
Get behind the "selling" of your industry to the American public. This is vital to you and your country.

John C. Vaaler

Editor



SPEEDLINE'S EXTRA LENGTH FEATURE GAVE US MORE PIPE PER FITTING DOLLAR



Flange where you want to, weld where you want to . . . any type joint can be used with any Speedline fitting. The longer straight section provides ample clearance that simplifies installation and permits easier hook-up of valves, flanges, etc. even in confined areas. The extra length feature is common to all Speedline Ells, Tees, Crosses, Reducers and Bends.

SEE DISTRIBUTOR LISTING PAGE 593 IN CHEMICAL ENGINEERING CATALOG.

Extra length on *every* end of *every* Speedline corrosion resistant fitting adds up to *real* savings in pipe costs, compared to systems using conventional fittings (see table).

Time and labor costs are also reduced from preliminary design to finished installation. Design detailing is minimized because any type joint can be used on any—or *all*—ends of a Speedline fitting. Speedline's longer length gives more clearance for welding and faster, *easier* pipe aligning . . . permits flanging *without* welding by a simple rolling-in operation! And because Speedline fittings are specially designed for use with low cost, light wall stainless pipe, material costs are substantially lower from the start.

Specify Speedline for your process lines—first in the industry to offer *extra* length for *greater* economy. Write for *free* catalog.

SPEEDLINE'S EXTRA PIPE LENGTH BONUS

I.P.S. SIZE	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	4"
90° Elbow	2½"	3"	2¾"	2½"	2½"	3"	2½"	4"	4½"
45° Elbow	2½"	3"	2¾"	2½"	2½"	3"	2½"	4"	4½"
Tee	4⅛"	4½"	4⅛"	3¾"	3⅜"	4½"	4⅞"	4⅞"	4⅞"
Cross	5½"	6"	5½"	5"	4½"	6"	6½"	6½"	6½"

With 100-2" Speedline elbows you get 25' more pipe than with conventional fittings. How do these pipe savings add up for your requirements?

Speedline®

STAINLESS STEEL FITTINGS

SPECIALLY DESIGNED FOR SCHEDULES 5 AND 10 PIPE

® REG. T.M. OF HORACE T. POTTS COMPANY

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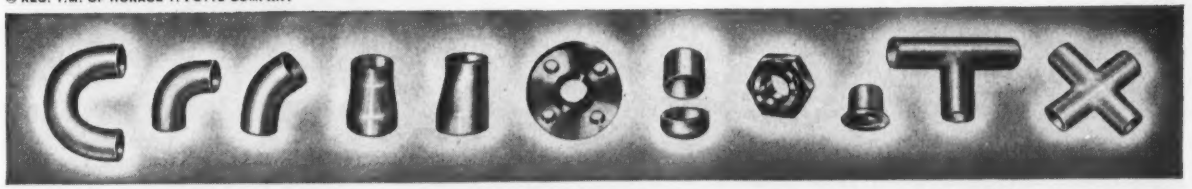

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CHEMICAL PROCESSING

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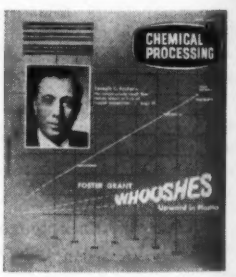
THIS MONTH'S COVER

Joseph C. Foster and his father, Sam, helped found Foster Grant Co., Inc. in 1919. He is now president of the company which began as a manufacturer of combs and hair ornaments and has evolved into an important producer of plastics raw materials. The story of this firm's phenomenal rise to an enviable position in its industry is told in the article beginning on page 27.



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• To subscribe to this magazine see reader-qualification form opposite last page

Spotlight On People

HANS STAUFFER, president of Stauffer Chemical Company, is elected a director of Columbian Carbon Company.

WILLIAM H. JACKSON is elected a director of Spencer Chemical Company.

At Allied Chemical Corporation, CHESTER M. BROWN is elected to board of directors. He is a vice president of Allied and president of its National Aniline Division.

HARRY H. BALTHASER is elected president of Fome-Cor Corporation, formed recently by Monsanto Chemical Company and St. Regis Paper Company.

Elected by the board of directors of Stepan Chemical Company are E. J. BLACK, vice president of sales; M. A. PARDIECK, formerly secretary-treasurer, now vice president and treasurer; and W. J. CREPEAU, secretary.

WM. E. MONTGOMERY is appointed vice president in charge of sales and operations of Thompson Chemicals Corporation.

WILLIAM P. GEE is elected vice president in charge of foreign petrochemicals for The Texas Company. He has been president of the Texas-U.S. Chemical Company since its formation in 1954.

DR. JESSE WERNER is elected a vice president of General Aniline & Film Corporation. He formerly was director of commercial development for General's Dyestuff and Chemical Division.

Also at Allied Chemical Corporation, JAMES W. SWAINE is appointed vice president of the General Chemical Division, succeeding JAMES G. FOX JR., who now is executive vice president of the National Aniline Division. Swaine will be in charge of his division's research, engineering, and construction activities.

MERLE F. KOBLISH is named sales manager for basic industrial chemicals produced by the General Chemical Div.

WILLIAM B. NICHOLSON is appointed a vice president of

Here is a NEW

HIGHLY EFFECTIVE
HIGHLY ECONOMICAL

way to dewater Granules and Crystals

the

BIRD-HUMBOLDT

Oscillating Screen Centrifuge

The Bird-Humboldt Centrifuge has already demonstrated its value to the coal and potash industries.

Its operating advantages and economies are such as to justify immediate consideration whenever you have a feed slurry in the plus 65 mesh range. They include:

big capacity — sizes from 5 to 50 tons per hour or more

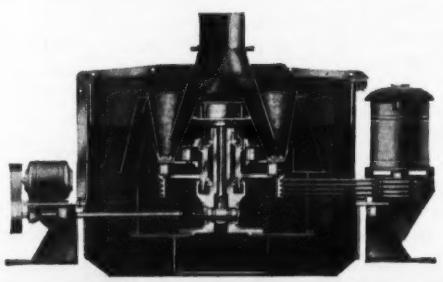
thorough dewatering — solids discharge on the order of 5% or less surface moisture

high solids recovery — 98 to 99% of solids input

almost no degradation of solids

long screen life — up to 3000 hours or more

low power input — on the order of 0.2 KWH per ton of dried solids



The Bird-Humboldt provides a unique combination of centrifugal and oscillating force, resulting in a smooth continuous fluid of flow of solids across the screen. The result is an evenly distributed, porous layer of solids in which the particles are constantly shifting their position, permitting the moisture to escape. Virtually no fines get into the effluent. Action is gentle and there is no scraping. This accounts for the amazing lack of screen wear and of solids degradation. *Write for descriptive Bulletin. Recommendations and estimates can be based on test data from the Bird Research and Development Center.*

BIRD

LEADING AUTHORITY ON SOLID-LIQUID SEPARATIONS

Builders of

- Bird Continuous Centrifugal Separators
- Bird-Prayon Continuous, Rotary, Horizontal Vacuum Filters
- Bird-Young Single Cell Rotary Vacuum Filters
- Bird Horizontal Tank, Vertical Leaf Pressure Filters
- Bird-Humboldt Screen Type Oscillating Centrifuges
- Bird Suspended Centrifugals • Bird Centrifugal Classifiers
- Bird Continuous Centrifugal Coal Filters • Bird Polishers

For specific information on individual machines write:

BIRD MACHINE COMPANY

South Walpole, Mass.

Regional Offices:
Evanston, Illinois
Walnut Creek, California
Atlanta 9, Georgia

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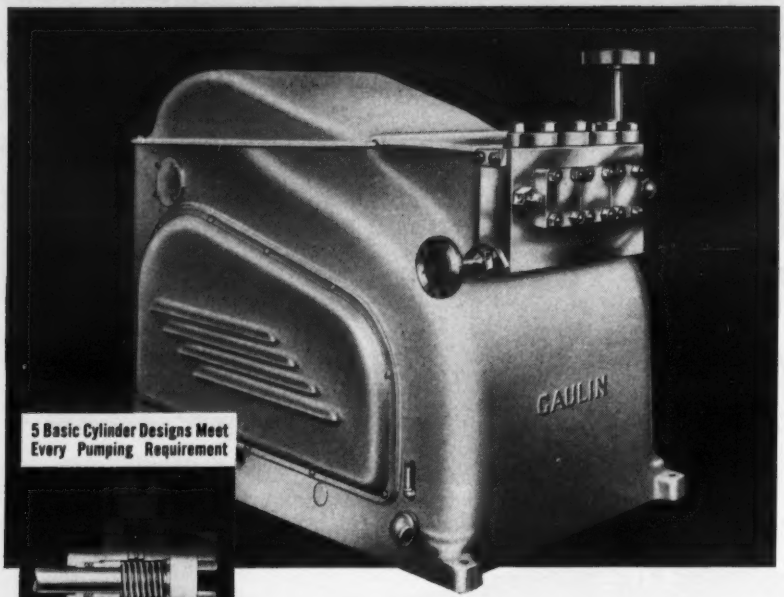
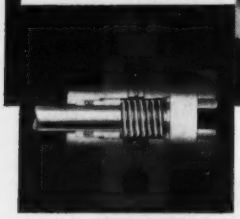
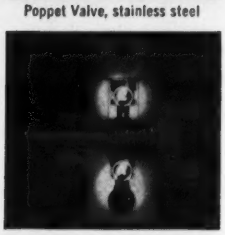
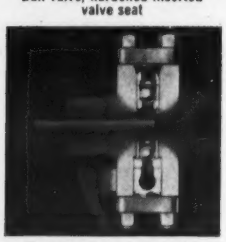



Spring loaded packing

Packing adjusting screw style stuffing box

Poppet Valve, stainless steel


Ball valve, hardened inserted valve seat


Ball valve, removable seats

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Reduce Operating and Maintenance Costs, Too!

Gaulin Horizontal Triplex Pumps handle large volume of all types and densities of fluids. Rugged, compact and dependable, they provide long service life at minimum maintenance costs in transfer, metering and spray drying applications.

Horizontal Design provides well area separating product from crank case.

Well Area can be gasketed for maintaining sterility . . . or for inert compatible chemicals (gases or liquid) for hazardous materials.

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Capacities from 50 to 6500 GPH . . . pressures from 500 to 12,000 psi.

Write for Bulletin P-55. At the same time ask for GTA . . . *Gaulin Technical Assistance* . . . for experienced advice and factual data on the best method to move or blend your product.

Gaulin TRADE MARK
MANTON Gaulin

55 Garden Street, Everett 49, Mass.

World's largest manufacturer of stainless steel reciprocating rotary, pressure exchange pumps, dispersers, homogenizers and colloid mills.

Check 1005 opposite last page

PEOPLE

Linde Company, division of Union Carbide Corporation, and ROBERT F. FLOOD is named vice president—gas products.

Hooker Chemical Corporation announces the following changes: DR. CHRIS A. STIEGMAN is promoted to the corporate position of director of research. He formerly was technical director. DR. J. HOWARD BROWN, formerly general manager, Niagara research and development, is appointed general manager—chemical research. DR. ALVIN F. SHEPARD becomes general manager—plastics research.

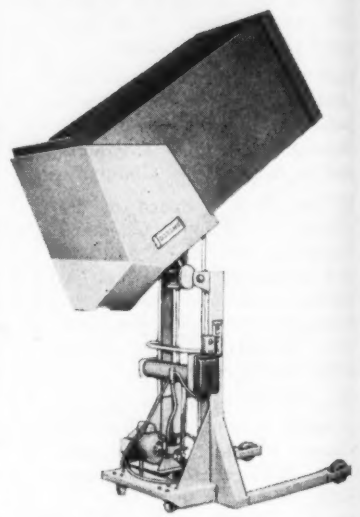
DR. FRANK J. SODAY joins Liquid Carbonic Division of General Dynamics Corporation as director of research and development.

The Textile, Paper and Industrial Divisions of Onyx Oil & Chemical Company have merged sales departments, and IRVING GAINES, formerly Industrial Division sales manager, is promoted to general sales manager. PHILIP E. MACLEAN is made sales manager.

JOHN R. BURKETT is named general sales manager for American Cyanamid Company's explosives and mining chemicals department. DR. N. B. SOMMER is appointed manager of the department, and JAMES M. MCNAMEE is taking over as sales manager of the petrochemicals department.

"Getting a dedicated scientist like Dr. Schmaltz as guest speaker wasn't easy . . ."

Now . . . a Powerful New TUBAR DUMPER Specially Designed for Bulk Chemical Containers



The new Tubar Twin-Cylinder Dumper is designed for all-purpose service in paint plants . . . pharmaceutical houses . . . granular plastics . . . and everywhere bulk chemicals are handled. It's built for years of rugged, heavy-duty service . . . cuts chemical container handling costs to the bone. Write for full information and operating specifications.

- **Most models can be made portable**
- **Stops and holds loads at any point in dumping cycle**
- **Optional splash-proof and explosion-proof power features**

UHRDEN is serving industry with a full line of all-purpose and special-purpose dumpers. Standard production models . . . or built to your specifications.

Tubar
ASSURES QUALITY
UHRDEN, INC. • DENNISON, OHIO
LIFTS • DUMPERS • CRANES
U-159-61

Check 1006 opposite last page

Monsanto to Hike Polyethylene Capacity to 100 Million Lb/Yr

Monsanto Chemical Company's Plastics Division has announced production capacity of high-pressure polyethylene facilities at Texas City, Texas, will be increased to 100 million lb/year. Construction is under way, and the project is scheduled for completion in third quarter this year.

Polyethylene is one of five major materials produced at Texas City. The others are styrene monomer, vinyl chloride monomer, acrylonitrile, and methanol.

Last month Monsanto also announced plans to put on stream a sodium polyphosphate plant at its Long Beach, Calif., facilities. Facilities are operated by the Plastics Division. Plant was designed by Monsanto engineers.

Mobay Chemical Company has scheduled a 50-percent expansion of production capacity for tolylene diisocyanate at its New Martinsville, W. Va., plant.

This is the second major expansion there since the facilities went on stream in 1956, and will increase capacity of TDI facilities to 18 million lb/year. A similar 50-percent expansion was completed last fall. Completion of the new work is scheduled for early 1960.

Pennsalt Chemicals Corporation plans a major expansion of its first ammonium perchlorate plant which went on stream last October at Portland, Ore. New facilities will increase capacity by several thousand tons.

At the same time, capacity of an adjacent sodium chlorate unit will be increased 25 percent. This facility provides the principal raw material for ammonium perchlorate. Upon completion, total investment in the Portland expansion program will total approximately $2 million.

The Carborundum Company announces it will build a $750,000 pilot plant for its Research and Development Division at Niagara Falls, N. Y. Construction of the building, procurement, and equipment installation is expected to be completed within a year.

American Cyanamid Company is building a multi-million-dollar anthraquinone manufacturing plant at Bound Brook, N. J., which will double annual production of this chemical.

The plant will replace and expand existing anthraquinone facilities. It will also provide additional production capacity for making methyl anthraquinone, naphthoquinone, and phthalic anhydride. Plant is expected to be completed late this year. Design and construction is under supervision of the company's Engineering and Construction Division.

American Potash & Chemical Corporation has under construction a large-scale commercial plant to produce boric oxide (boric acid anhydride) at its main plant at Trona, Calif. Plant is expected to be on stream late this year.

An accompanying increase will be made in the Trona plant's boric acid production capacity. Estimated cost of new facilities is approximately $800,000.

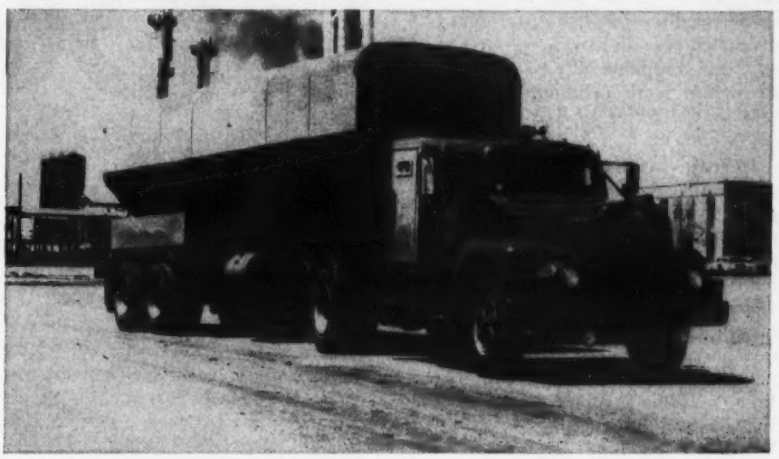
American Potash announced a new $4.3 million sodium chlorate plant has gone on stream at Aberdeen, Miss. It is designed for an initial production of 15,000 tons a year.

The Firestone Tire & Rubber Company disclosed plans to build the world's first plant to produce synthetic Diene

SPROUT-WALDRON SW Pointers

for Mixing and Blending • Size Reduction • Pelleting and Densifying • Size Classification • Bulk Materials Handling

Published in the interest of better processing by Sprout, Waldron & Co., Inc., Muncy, Pa.



One of five Sprout-Waldron Pneumatic Aluminum Bulk Trucks for handling polystyrene pellets in Cosden Petroleum's new "curb service marketing" delivery concept. Note Cosden's modern 32,000 barrel custom refinery in background.

SPROUT-WALDRON BULK TRUCK HANDLES POLYSTYRENE PELLETS

A recent announcement by officials at Cosden Petroleum Corporation, Big Spring, Texas of a new delivery concept, "curb service marketing" is arousing considerable interest throughout the plastic industries. The revolutionary marketing plan involves a delivery of polystrene pellets by special highway transports direct from the purchasing plant to the customer.

The key to the new concept is a group of five 28' pneumatic aluminum bulk trailer units designed and built by Sprout-Waldron. Each of these trailers has a capacity of 1,182 cubic feet which is equivalent to 34,000 lbs. of polystyrene pellets. The high powered unloading system permits delivery to the customer at the rate of 30 tons per hour. Delivery and storage in bulk cuts down on fringe expenses such as unloading, warehousing, multiple handling and contamination. Bulk storage also permits instant inventory determination. Storage bins can be located at the most suitable point in the plant since the pneumatic unloading system built into the trucks permits delivery anywhere a pipe can be run.

Recent completion of the new polystyrene plant is said to make Cosden Petroleum the first producer able to integrate all phases in the manufacture of this basic material. Both general purpose crystal polystyrene and high impact polystyrene are being produced. The styrene monomer used in manufacturing polystyrene is produced in an adjacent plant also owned and operated by Cosden.

For more information on how Sprout-Waldron pneumatic bulk trucks may fit your application, write for Bulletin 205.

COP/102

Check 1007 opposite last page

and Coral rubbers. The former is a partial replacement for natural rubber; latter is a complete replacement.

Plant, to be built as an addition to the company's petrochemical center at Orange, Texas, will have an annual capacity of 30,000 tons of either product. Both can be produced in the same plant, and the company will be able to switch from production of one to the other as required.

Hercules Powder Company and Stauffer Chemical Company have announced completion of an agreement whereby the two firms will jointly form a new company to produce aluminum trialkyls and other aluminum alkyls. The new firm will have a yearly capacity in excess of one million pounds. Project will be the first large installation in U. S. to produce aluminum alkyls commercially by the Ziegler process.

B. F. Goodrich Chemical Company, a division of B. F. Goodrich Company, disclosed a fully automated vinyl chloride monomer production unit is being installed at its Calvert City, Ky., plant.

A company spokesman said the installation, due to be completed in June, will be the first in the chemical processing field to utilize this digital system to operate a chemical process specifically designed for computer control. The system, engineered by the Thompson - Ramo - Wooldridge Products Company, will exercise closed-loop control over the process, and will log operating data, computed values.

Diamond Alkali Company has announced a $2-million program to modernize its chlorine-caustic soda-producing facilities at Painesville, Ohio. Tucker-Windecker type cells in the 30-year-old cellroom are being replaced with Diamond's advanced-design 30,000-ampere rectangular cells. Project is due for completion this fall.

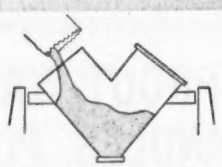
The new units, which will be able to produce the same quantity of the chemicals,

ENTIRELY NEW PRINCIPLE enables you to . . .

Blend liquids and solids intimately in one operation

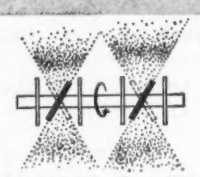
It is now practical, with the P-K "Twin-Shell"* blender, to blend many difficult formulations that have heretofore been either impossible or impractical because of the number of separate operations required to achieve a desired product. With the new "Twin-Shell" blender, liquids, solids, clumpy and crystalline materials can all be intimately blended in one operation. Average blending time: 5 to 15 minutes. The P-K "Twin-Shell" blender is unlike any other blender. It works on an entirely new blending principle. Here, in diagram, is how it works.

*Patented

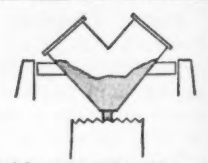


CHARGE DRY SOLIDS through top of either shell. Optimum charge level for most materials is about 65% of total shell volume.

TUMBLE AND AERATE. As shell revolves, rapidly spinning wire cage intensifier breaks up agglomerates, literally creates dust storm in material.

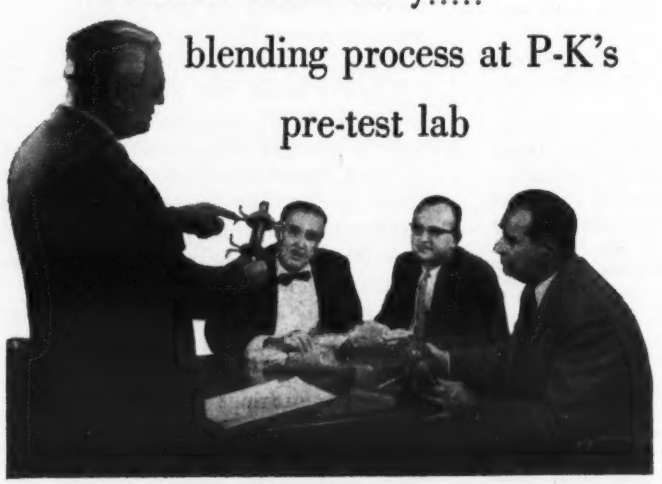


ADD LIQUID. Centrifugal force sprays atomized liquids from periphery of control discs on Liquid-Feed Bar into finely dispersed solids.



DISCHARGE PRODUCT easily through apex of shells. Accessibility of interior and easy removal of Liquid-Feed Bar speed cleaning.

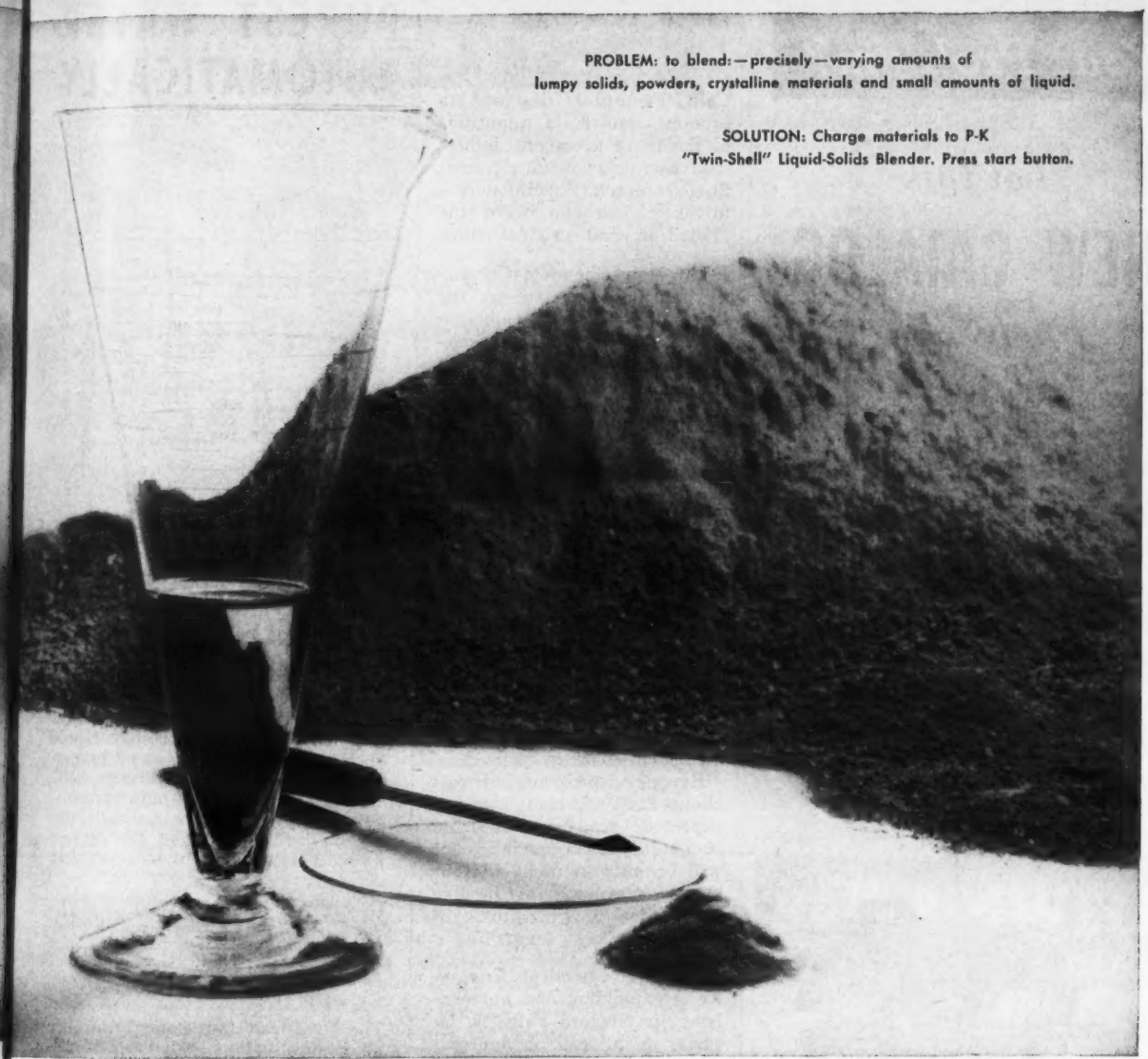
Get new ideas for your blending process at P-K's pre-test lab



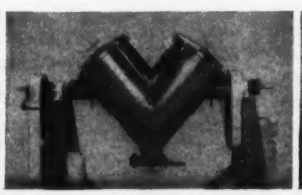
Complete, scientific investigation of all types of blenders now available at Patterson-Kelley.

Blending of complex formulations is full of variables. The equipment and procedure that are ideal for one combination of ingredients may be unsatisfactory for another. Proper selection of equipment demands thorough scientific investigation. You can conduct your investigation at Patterson-Kelley's Customer Pre-Test Lab, at East Stroudsburg, Pennsylvania. Since P-K makes practically all types of blenders, you can run conclusive comparison tests with your materials. Trained technicians will help you.

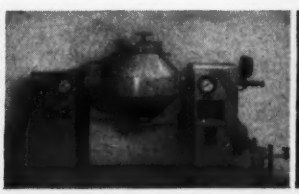
To set up an appointment, just place a collect call to Russell Dotter at Patterson-Kelley. Tel. No.: Stroudsburg 820. He'll be happy to tell you how much of your materials to bring and to give you other details. East Stroudsburg, in the Pocono Mountains, is just 2 hours from New York City, easily accessible by all carriers.


PROBLEM: to blend:—precisely—varying amounts of
lumpy solids, powders, crystalline materials and small amounts of liquid.
SOLUTION: Charge materials to P-K
"Twin-Shell" Liquid-Solids Blender. Press start button.

"TWIN-SHELL" Liquid-Solids laboratory models are made in transparent Lucite or stainless steel, in 8 and 16 quart sizes.



PRODUCTION MODELS of the "Twin-Shell" blender range up to 50 cu. ft. capacity. (Intensifier and Liquid-Feed Bar optional.)



VACUUM TUMBLE DRYERS by Patterson-Kelley are avaliable in sizes down to the standard 1 cu. ft. capacity lab model.

PRODUCTION MODELS of the Vacuum Tumble Drier have capacities up to 150 cu. ft., come factory aligned, piped, instrumented.

BLENDER LITERATURE. Specialized information and data in greater detail are given in two Patterson-Kelley publications: Bulletin No. 16, Chemical Process Equipment and Bulletin No. 15A-1, Twin-Shell Laboratory Blenders. Write for your copies today. Patterson-Kelley Company, Chemical and Process Equipment Division, 1804 Hanson St., East Stroudsburg, Pa. 15

Patterson Kelley

Chemical and Process Equipment Division

Check 1008 opposite last page

will reduce space formerly required by 60 percent. Number of electrolytic cells will be cut from 2432 to 144.

Union Carbide Corporation has under construction at Cartersville, Ga., a plant to produce polyethylene film. Facility will be operated by Visking Company, a Union Carbide division. Plant, being built on a 15-acre industrial site, is scheduled for completion in July.

Union Carbide also announced plans to build a 15 million lb/year polyethylene unit in Melbourne, Australia. Union Carbide Australia, Ltd., the company's Australian affiliate, will erect and operate the facility—the first by this organization. Part of the output will go to the New Zealand market.

Du Pont has placed on stream a multi-million-dollar sodium and chlorine unit at Memphis, Tenn., thus increasing the company's capacity for these chemicals by about 50 percent. Du Pont's Electrochemicals Department operates the plant.

Part of the additional chlorine capacity will be used to produce titanium dioxide at Du Pont's new 45,000-ton plant now being built at New Johnsonville, Tenn.

Two other major projects, nearing completion at Du Pont's Memphis plant, are due to be in operation about midyear. One is a plant to produce "Oxone" monopersulfate compound, a new solid peroxygen bleaching agent, and increased production facilities for hydrogen peroxide.

At Dordrecht, The Netherlands, Du Pont plans to begin construction later this year on a 15 million lb/year, multi-million-dollar plant to manufacture "Orlon" acrylic fiber. The facility will be operated by a Du Pont subsidiary which will be formed in The Netherlands. Plant start-up is scheduled for late 1961.

Shell Chemical Corporation reports initial production from its $2-million market-development unit at Martinez,

Is Filtration Your Problem?

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NEW CATALOG

help you

FIGURE the filter area and capacity required for your process and the size of filter press needed.

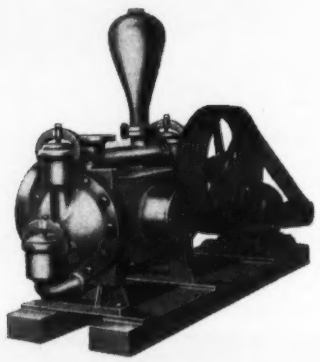
DETERMINE COST of the filter press based on its size and required materials of construction.

SELECT the filter press design and type best suited to your needs.

Is the fluid
Corrosive
Abrasive
Viscous
Delicate
Thick

then you need a

SHRIVER DIAPHRAGM PUMP



Here's the time-tested positive displacement pump that cuts operating and maintenance costs in handling materials that quickly wear out ordinary pumps. It's a double-acting piston pump without packings; no leakage; easy to clean and service; low power cost; capable of discharge pressures to 100 psi. Bulletin 137A gives the facts.

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HORIZONTAL PLATE FILTERS • CONTINUOUS THICKENERS
SLAB FORMERS • DIAPHRAGM PUMPS • ELECTROLYTIC CELLS

Check 1009 opposite last page

Calif. Facility is designed to produce semi-scale quantities of the more promising industrial chemicals resulting from Shell research. Several derivatives of acrolein were included in first product runs.

The Dow Chemical Company has placed on stream the first full-scale production plant for "Trycite," the company's polystyrene film, at Cleveland, Ohio.

Allied Chemical Corporation's General Chemical Division has announced plans to expand sulfuric-acid-producing facilities at its Richmond, Calif., plant.

Nopco Chemical Company's Plastics Division is tripling the size of its plant at North Arlington, N. J. Expansion will provide six-fold increase in capacity for making polyurethane foams and will permit expanding facilities for foamed-in-place systems.

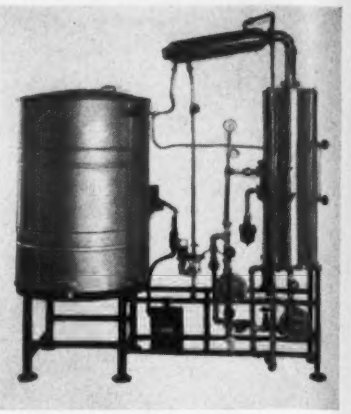
Expansion program will cost about $500,000, and work is expected to be completed about July 1. Expanded plant will be able to make in four hours a volume of flexible foam that now requires 24 hours.

Stauffer Chemical Company is expanding and modernizing its Niagara Falls, N. Y., plant at a cost of approximately $2 million. When project is completed later this year, company's capacity to produce caustic soda and chlorine at Niagara Falls will be increased about 25 percent.

Company also is converting entire plant from 25-cycle to 60-cycle power, a move necessitated by limited resources of former type of power now available, due in part to destruction of Schoellkopf generating plant in 1956.

Spencer Chemical Company and Industrial Rayon Corporation disclosed they have decided **not** to build jointly a $10-million plant at Ashland, Ky. Facility was slated to produce caprolactam. Plant site will be retained, but Spencer officials said there are no immediate plans for its use.

PUREST WATER AUTOMATICALLY



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It's the most reliable, efficient, and completely automatic method of producing distilled water . . . no human attention needed. Self-Starting, Self-Stopping, and Self-Flushing controls *automatically* guarantee a steady supply of distilled water of the *highest purity*. Catalog "G" provides complete description.

BARNSTEAD AUTOMATIC PURITY CONTROL

The Barnstead Puromatic Controller automatically **tests each drop** of distillate from the Still and permits *only* distilled water of a predetermined purity to enter the storage tank. Another Barnstead exclusive feature.

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Check 1010 opposite last page

CHEMICAL PROCESSING LETTERS FROM READERS

CP article by Hartley stirs controversy as . . .

Senator, university official differ on "Right-to-Work" law

Fred A. Hartley Jr., co-author of the Taft-Hartley law, recently granted an exclusive interview to CHEMICAL PROCESSING magazine in which he asserted that a continuing fight should be waged for the right to work. Senator Barry Goldwater (R., Ariz.) and John W. McCollum, director, Union Research & Education Projects, University of Chicago, have expressed divergent views on this controversial subject. Their comments follow:

SENATOR GOLDWATER

In the field of labor relations, there are few as qualified as Mr. Fred Hartley to write on the subject of right to work. Co-author of the Taft-Hartley law and a man who has devoted decades to study in this field, Mr. Hartley has my highest regard and the respect of many of my colleagues.

As a senator from a state which has had a right-to-work law since 1946, I would like to emphasize Mr. Hartley's statement that wages and living conditions are improving at a faster rate in those states which have right-to-work laws than in those states which do not.

The Arizona law has withstood the test of labor bosses who attempted to have it repealed, making clear the fact that it is a law for the protection of citizens' rights and one which the people want. Labor bosses continually try to make right to work an issue. Yet, in my election last November, I made my greatest voting gains, compared with my election in 1952, in the more industrial, heavily unionized areas of Arizona.

The issue of voluntary vs compulsory unionism is one of

To bottom of page 15

JOHN W. McCOLLUM

This issue is rooted in age-old arguments of individual vs group rights and should be discussed in this context.

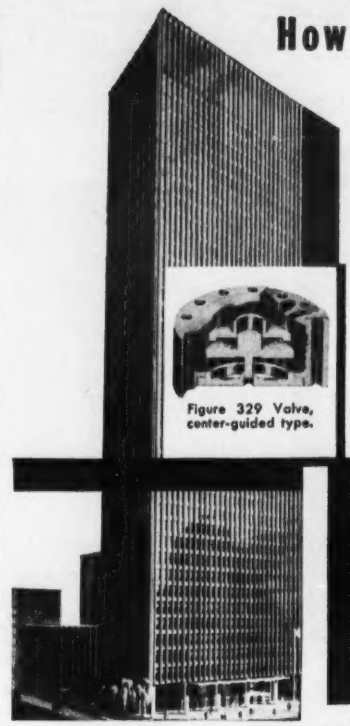
Mr. Hartley provides little help here. Even worse, he sets up and knocks down questionable strawmen to buttress his arguments. He doesn't tell us the laws are subtly misnamed. He chides labor for "reversing itself": It favors the union shop and once opposed the "yellow-dog" contract. However, the latter was imposed by employer action, while the former results from a majority vote of interested workers.

He must realize that a lower economic base is the explanation, and not "right-to-work" laws, if wages and conditions are improving at a faster rate in right-to-work states. He over-exaggerates union power; the $700 million in annual dues is scattered among some 75,000 local and 180 national unions, and unions have little control over welfare funds; they administer about 0.5% of them.

More could be said, but obviously Mr. Hartley is more concerned with reducing union effectiveness than strengthening worker rights. The real question is: Under the union

To next page

How to **silence** 38 stories of piping



In the new Seagram Building in New York, Williams-Hager Silent Check Valves control water hammer. They silence and protect piping by operating instantly when flow reversal starts or when flow is zero. Just one of hundreds of outstanding buildings protected by Williams-Hager Valves.

Figure 329 Valve, center-guided type.

Write for Bulletins
—No. 654 on Valves, No. 851 on Cause, Effect and Control of Water Hammer

WILLIAMS • HAGER *Silent* CHECK VALVES

Architects: Mies van der Rohe & Philip Johnson. *Associate Architects:* Kahn & Jacobs. *Consulting Engineers:* Jaros Baum & Bolles. *General Contractor:* George A. Fuller Company. *Plumbing Contractor:* Eugene Duklauer Inc.

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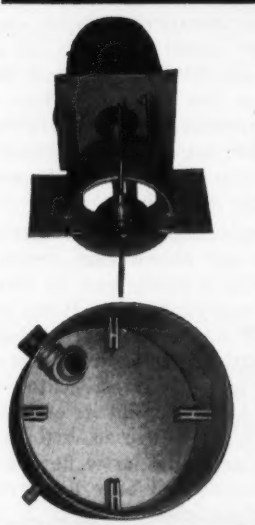
NEW AMWELL Tank Mixer
WITH HIGH-SHEAR IMPELLER



More Efficient for Mixing Dry Materials with Liquid

Uses high-shear impeller with controlled recirculating mixing to disperse a wide variety of highly cohesive solids in liquids. Positive flow impeller and high speeds (3500 RPM) develop the high shear without the disadvantage of close clearances. Can be furnished in single or multiple stages to accommodate a wide range of solid and liquid rates, for continuous or batch mixing.

Impeller rotates within a baffled draft tube. Feed materials are drawn into impeller suction eye and instantly dispersed. Baffles completely eliminate swirl and insure thorough tank turnover. Unique design and high velocity action insure passage of the raw feed through the high shear zone, promote thorough recirculation and prevent sedimentation. Ruggedly built. Standard materials are carbon steel, bronze and stainless steel. Special alloys can be provided.

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OUR 91st Anniversary

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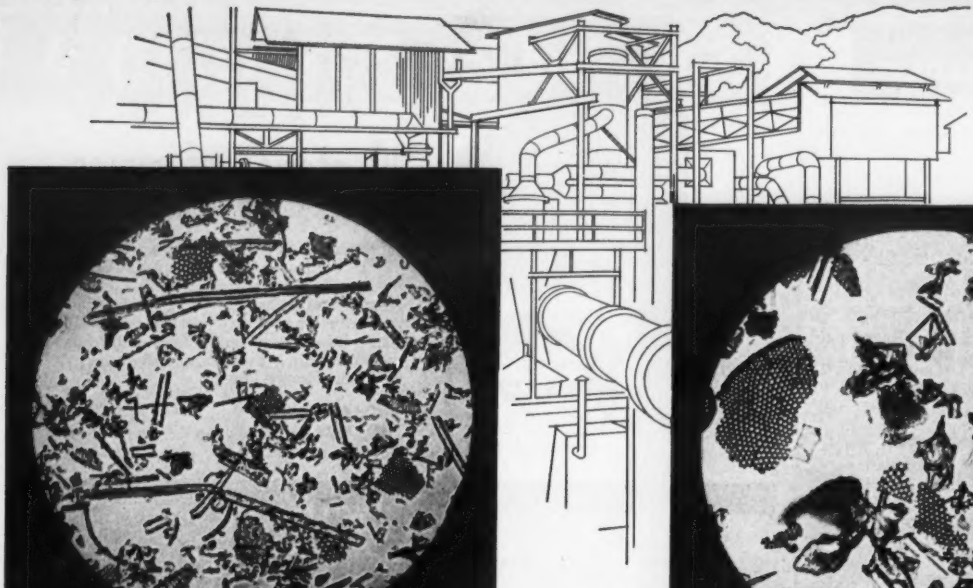
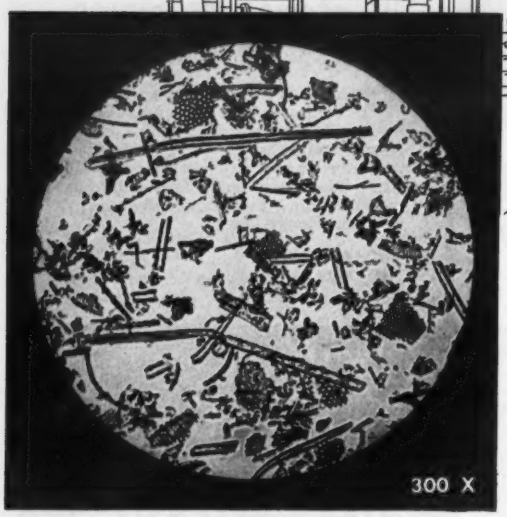
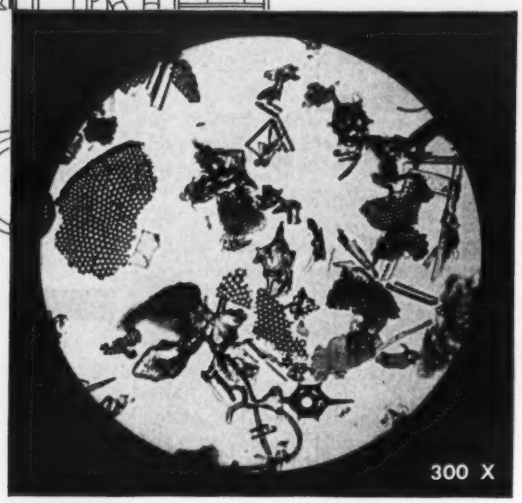


Milling and calcining equipment used for all Celite grades.



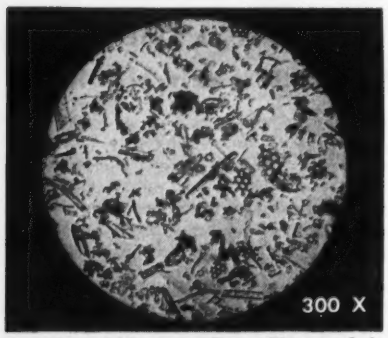
For high-clarity filtration of most liquids—use this specially milled diatomite, Hyflo Super Cel.



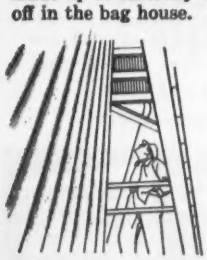
For filtration of larger suspended particles—Celite 545 combines maximum clarity plus faster flow rates.

In diatomites, Johns-Manville precision processing works for you

Constant uniformity in every grade of Celite assures consistent results, less down-time



For mineral filler use—Super Floss grade is made up of carefully sized fines air-floated off in the bag house.



Typical J-M bag house equipment.

As THE MICROSCOPE SHOWS, each grade of Celite* diatomite has its own distinctive particle size distribution. Yet no matter where or when purchased, each remains uniform from bag to bag—your assurance of top production results with minimum down-time.

Three examples of flux-calcined Celites are shown here. Hyflo® Super Cel is widely used for filtration in many industries. It has just the right combination of coarse and fine particles to assure optimum clarity and flow rates. Celite 545, with a higher percentage of coarse particles, is used to achieve maximum clarity and faster flow rates with liquids that have larger suspended particles.

Super Floss, one of several bag house grades, has fine particle size distribution. A white powder, it is processed within very narrow tolerances (2-4 microns). It is a popular mineral filler in fine products such as silver polishes.

Johns-Manville can precision-produce so many different grades of Celite because it mines the material from the world's largest and purest commercially available deposit. For assistance with specific filtration or mineral filler problems, talk to a nearby Celite engineer. Or write direct to Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

JOHNS-MANVILLE

Check 1013 opposite last page

LETTERS

John W. McCollum

From preceding page

shop are the rights workers relinquish less important to them than those they gain?

I think workers give up little and stand to gain a great deal. The same can be said of other facets of life: plant safety regulations, social security laws, and the like. All provide benefits (so most citizens think) that outweigh the rights lost.

This is a consistent argument. It fits in with the nature of society and emphasizes a worker's duty to join and be responsible for the major organization affecting his work life. And where "right-to-work" laws can do little in cleaning up disagreeable union practices, responsible and duty-conscious union leaders and members could do a lot.

Wilt thou join us in a firkin of ale?

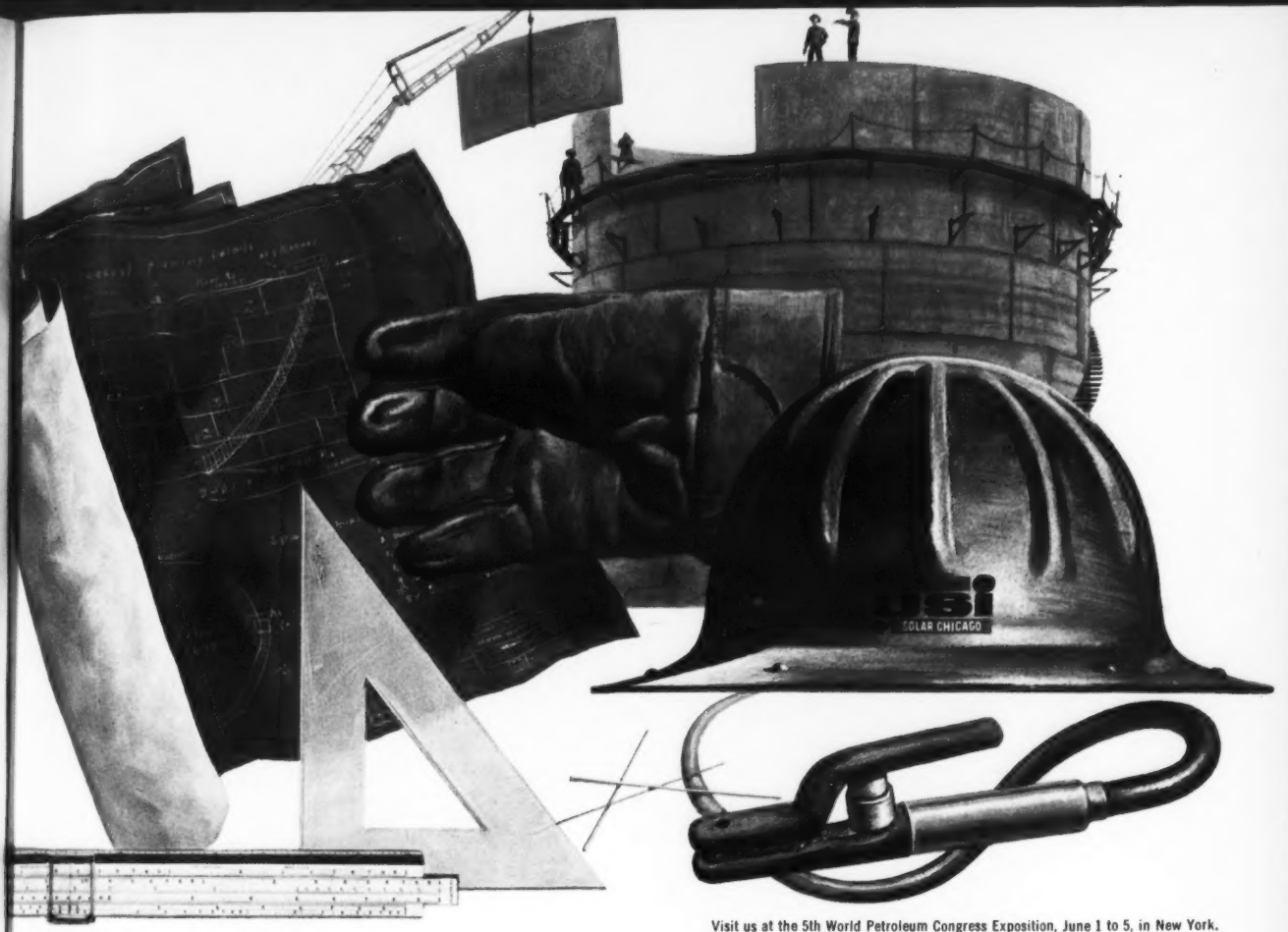
Another letter has just cantered in to vie for the title of "Most Uncommon Constants." So far it is neck and neck in the backstretch. The formsheet shows there's no odds-on favorite. There's still time to be a dark horse. Get your "bets" in.

Dear Editor:

Still under the spell of Chaldron Ell Slug's letter (December CP, page 10) about his "Variable Constant System," our new Russian colleague, Karl Kachuffski, stalked into the office the other day to tell us about the fascinating archaic units in Lange's "Handbook."

Did we know that one British barleycorn is equal to 0.844667 cm? We didn't — the only barleycorn with which we are at all familiar (and this entirely by hearsay) is one *John* Barleycorn. Did we know that a chaldron (U. S.) is 1.2686 cubic meters? No, we always thought that a chaldron (U. S.) is 1.2687 cubic

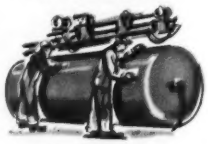
For more information on product at right, specify 1014 . . . see information request blank opposite last page.



Visit us at the 5th World Petroleum Congress Exposition, June 1 to 5, in New York.
International Oil Show, May 14 to 23, in Tulsa.

Have Crews...will travel

ENGINEERING



FABRICATION

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What you need in field erection...
When you need it...Where you need it

Our field crews at Solar Chicago are craftsmen capable of handling the erection and construction of pressure vessels, towers, tanks, shells or other structures. These men have stacked up years of experience and have been organized into highly efficient mobile crews ready to tackle the toughest job. They find it no problem to translate your needs into the structure you require on your site, on time.

When you require any field erection, why not call Solar Chicago? We welcome your inquiry.

Write today for our brochure.

USI Solar Chicago DIV. U.S. INDUSTRIES, INC.
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Telephone POrtsmouth 7-8900

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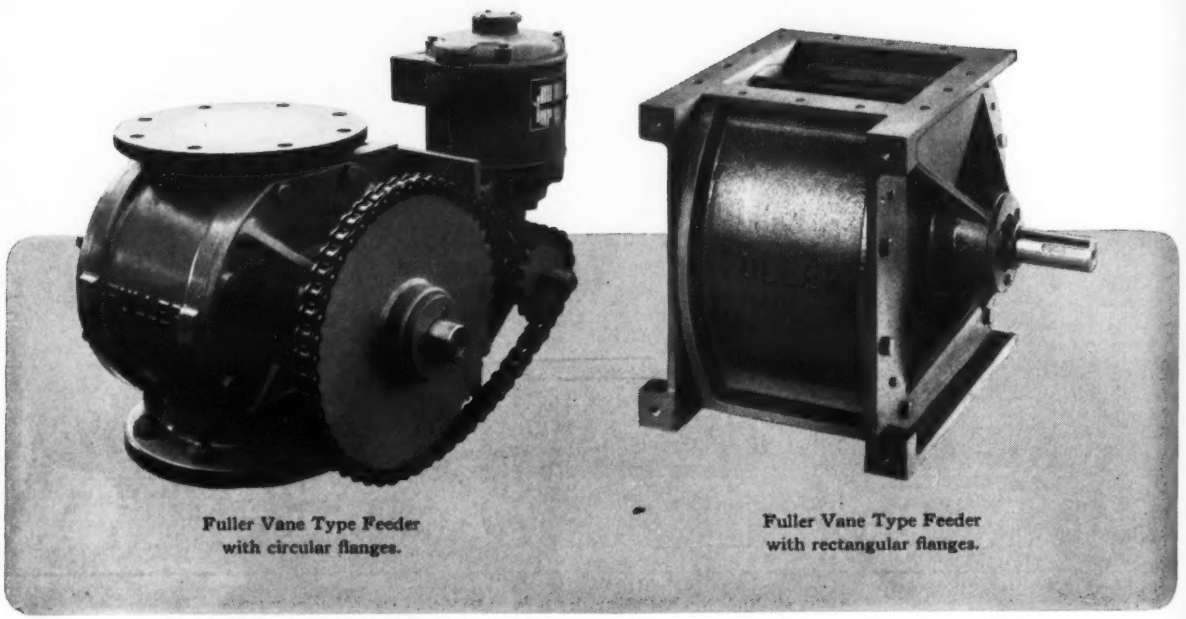
Fuller Feeders
Keep Conveyors Flowing Freely

. . . whether the load is a few pounds a minute or many tons an hour



Fuller Vane Type Feeder with circular flanges.

Fuller Vane Type Feeder with rectangular flanges.

Fuller Vane Type Feeders assure you of dependable handling of dry, pulverized and granular materials. They're available in capacity ranges to meet all normal plant requirements, and are built with circular or rectangular outlets. Check these Fuller cost-saving features . . .

Extra-rugged construction. Heavy, cast iron body walls and headplates add rigidity, longer life. Stainless or other metals can be used where sanitary or corrosion requirements demand their use.

Sealed bearings are equipped with Alemite fittings for ease of lubrication and long life. Abrasive particles can't enter, maintenance is cut.

Make effective air locks. Fuller Vane Type Feeders can be used as air locks for pressure differentials up to 3½ lbs.

Stuffing boxes and ball bearings for vacuum, low-pressure and general applications.

And, where extreme volumetric accuracy without pulsation is needed, there's a line of Fuller Roll Type Feeders. For full details on Fuller Feeders write for Bulletin.

See Chemical Engineering Catalog for details and specifications . 1306 F-20

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Check 1015 opposite last page

meters and it was quite a blow to find how much in error we'd been all these years. A noggin, says Kachuffski, is 142.07 cc — about right for a stirrup cup or cocktail.

Pieds, or French feet, are equal to 0.32485 m. The only French feet we knew very well were delightfully dainty (nowhere near a third of a meter in length) and belonged to a petite Yvonne Beauvoir, a French Canadienne from our salad days. There's no need to say "Seventy gallons," Kachuffski maintains, when you can shout, "Garcon, bring me a puncheon of champagne," and if you find 0.03125 British gal creeping too often into your drawing room conversation, use "quartern" instead.

If your garden is king-size and measures 34.8000 yards by 34.8000 yd, you have 1211.04 sq yd to spade up and that's so near a British rood (1210.00 sq yd) that you needn't worry very much about the difference. Some days *we* don't worry about 1.04 sq yd at *all*.

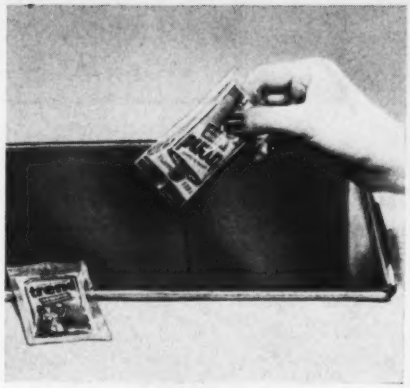
Kachuffski claims that the scruple is 0.00285714 lb avoirdupois; quick reference to Lange shows that this is just the common or garden variety of scruple. There *is* no such thing as a Russian scruple — in fact, the Russians seem to *have* no scruples. We hope that Comrade Kachuffski doesn't read this far in the current issue of CHEMICAL PROCESSING. He might be tempted to fetch us a puncheon the noggin!

D. S. DAVIS
University of Alabama

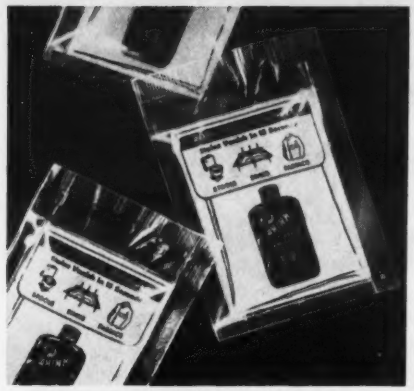
Senator Goldwater

From page 13

the most important subjects before the nation today. No political figure can shrink from taking a stand on it. My belief is that eventually unionism will be banned in every state in the Union, that right-to-work laws will be on the statute books from Maine to California. I believe this because what is involved is a basic human right, which will someday have to be legally recognized and protected.



LIQUID DETERGENT is safely packaged in envelopes of "Scotchpak". Tests on polyethylene and other film laminates showed seam leakage. "Scotchpak" holds tight.



STRONG CHEMICALS—in liquid or dry form—can be packaged in "Scotchpak". Film resists puncturing and tearing, can be printed easily—no anchor coat needed.

PASTE CLEANSER shelf life was extended 50% when this manufacturer switched from polyethylene to "Scotchpak" Heat-Sealable Polyester Film.

SAMPLES of almost any inorganic or organic compound can be sealed in envelopes of "Scotchpak". Transparent packages are easy to handle, easy to ship and store.

SCOTCHPAK BRAND
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SCOTCHPAK® BRAND HEAT-SEALABLE POLYESTER FILM
SCOTCHPAK BRAND

"SCOTCHPAK" TAKES OVER

and streamlines a multitude of packaging jobs!

Looking for a film that's *tough*, clear as glass—one you can freeze or boil? And would you like that same film to be heat-sealable with a seal that's as tough as the film itself? Then your answer is "Scotchpak".

Here is a film that combines the best features of many films. It can be heat-sealed in less than 2 seconds —a temperature of 300° to 400° F. and 20-60 psi is all that's required.

"Scotchpak" Film resists freezing cold (down to -70°F.) and boiling heat (up to 240°F!). It resists acids, oils, alkalies and organic solvents. It is light (saves shipping costs!) and compact (saves space in shipping and on the shelf, too!).

"Scotchpak" is now available in roll-stock widths up 50 inches—from 2 mils to 4.5 mils thick, ready for printing—if you desire. It can be easily handled on conventional bag making and filling equipment.

Our Customer Service organization is ready to work with you—to show you how "Scotchpak" can solve your film fabrication and packaging problems. For complete information, write Film Products Group, Dept. TM-49, 3M Company, St. Paul 6, Minnesota.

See us in Chicago at the 28th National Packaging Exposition! 3M booth Nos. 625, 633, 635, 639, 643 See you there April 13-17

"SCOTCHPAK" IS A REGISTERED TRADEMARK FOR THE HEAT-SEALABLE POLYESTER FILM OF 3M CO., ST. PAUL 6, MINN. EXPORT: 99 PARK AVE., NEW YORK 16. CANADA: LONDON, ONTARIO

MINNESOTA MINING AND MANUFACTURING COMPANY
...WHERE RESEARCH IS THE KEY TO TOMORROW
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Check 1016 opposite last page

Protects Metals Against Hot Acids, Acid and Sulfurous Fumes, Salt Spray, Steam, Mild Alkalies, Up to 600°F.

Markal "D-A" Coatings will protect metal against any corrosive action. It is an ideal product for ore sintering plants, plating plants, food plants, lumber kilns, foundries, chemical plants, sewage disposal plants, laundries, heat exchangers . . . many others.

Markal "D-A" Coatings are applied by brush or spray and can be air dried or baked. The Coatings will withstand temperatures up to 600°F.

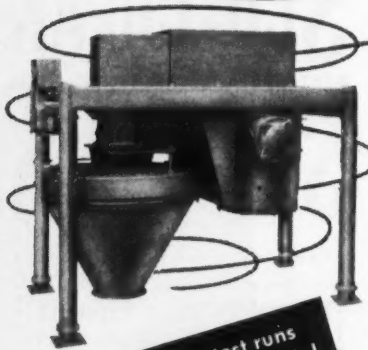
For free sample write on company letterhead, stating temperature extremes, surface temperature at time of application, and corrosive condition.

Other Markal Coatings are available in a complete range of types for any condition and temperatures up to 2200°F. Send for catalog No. MPC. The **Markal Company,** 3055 West Carroll Avenue, Chicago 12, Illinois, telephone Sacramento 2-6085

Check 1017 opposite last page

MIX BETTER BY

IMPACT



Finer and more intimate dispersion of solids can be achieved using an Entoleter® centrifugal impact mill.

- Low cost — low power requirements
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RECENT APPLICATION

For the final dispersion of detergent, bleach, perfume and highly abrasive silica flour in a popular powdered household detergent, this 27" model with abrasion resistant impactors does the job.

Free test runs on your material.

Send for literature on Impact Milling, Particle Size Reduction and the new line of Vibrating Screens.

ENTOLETER
DIVISION OF SAFETY INDUSTRIES, INC.

Check 1018 opposite last page

Watching Washington

Farm-products Research Bill Might Help—and Hurt—CPI

Castigating farm laws since the 1930's as "miserable failures," Sen. Homer Capehart (R., Ind.) has introduced a bill (S. 1124) calling for creation of an Industrial Agricultural Products Administration charged with developing new uses and new markets for farm products. The agency would report directly to the President.

Eighteen senators of both parties co-sponsored the bill. A similar proposal last session passed the Senate, but died in the House.

The bill charges the proposed agency with the job of conducting research (both "scientific and chemical"), field studies, pilot-plant manufacture and, when necessary to prove commercial feasibility, actual manufacturing operations, in an effort to develop industrial uses for greater quantities of agricultural products.

The bill would give the proposed agency $1 million for a "crash program" between now and June 30, end of the fiscal year. It would provide $100 million beginning July 1.

Senator Capehart believes the Department of Agriculture now has sufficient technical knowledge to find industrial uses for an additional five billion bushels of grain annually.

Compliments Industries

While complimenting chemical and petroleum industries on research efforts, the senator said he believed government research and development is necessary to achieve some of the following:

1. Blend alcohol produced from grain into gasoline. Aware that gasoline can be produced cheaper than alcohol, he feels research will lower the cost of producing alcohol from farm products. Estimated grain use — two billion bushels.
2. Paint from vegetable oil. If 10 percent of the potential is reached, grain used would total at least 15 million bushels a year.
3. New drug plants, increased use of starch in paper, high-protein food by fermentation, boxboard and building board from wheat, and synthetic rubber from grain should total, according to Capehart, over 500 million bushels of grain annually.

In his address to the Senate, Capehart also included a wide range of product possibilities, from smokeless powder and plastics to antifreeze, dyes, and synthetic fuels.

Good Chance of Passage

Listed among supporters of the bill are virtually all groups in the powerful farm lobby. Early reaction here is that the bill, which has bi-partisan support, has a better chance of passage than previously.

Such a program might be quite helpful to chemical processors. It might mean royalty-free licenses on valuable new processes. It could result in development of certain grain products, which would be economically sound alternate raw materials.

On the other hand, it will see government development of grain in competition with privately supported development work in coal or petroleum, Also, there's the ever-present danger that if the government actually undertakes subsidized chemical manufacture — as authorized by S. 1124 — the resulting products might well knock the bottom out of any given market.

To page 18

THAT'S INTERESTING

Castro, please note

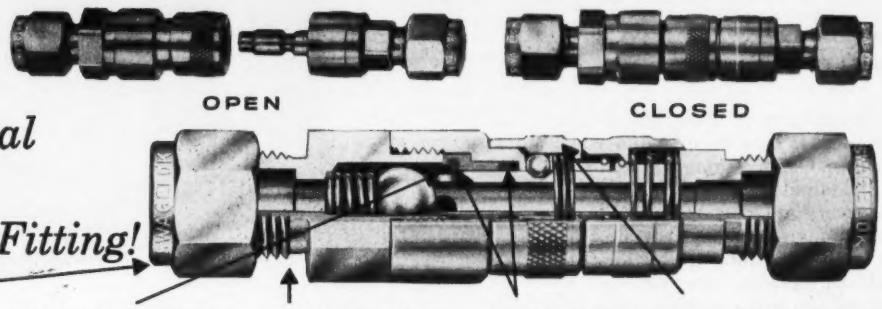
Fidel Castro, Cuba's new political boss, says more of his countrymen need jobs.

There's a potential of 3000 right under his nose. Cuba uses 45 million bags annually for its sugar, coffee and rice crops. Bags are made of jute, which must be imported. An excellent substitute is a plant called kenaf, now grown and harvested in Cuba, which could eventually provide the country with a new and important industry.

Stanford Research Institute estimates such a development would mean about 3000 new jobs for Cubans and a new source of gross revenue amounting to $12 to $15 million. It is believed kenaf might in the future become a profitable export item.

Swagelok Quick-Connect Fitting Installation in Boeing Airplane Company, Seattle, Wash., Test Facilities for Boeing 707 Jet Stratoliner.

Here's the secret of this fast, positive-seal Swagelok Quick-Connect Fitting!



1. Swagelok Quick-Connects with single end or double end shut off for tube to pipe, tube to tube, bulkhead tube to tube applications are available in brass and stainless steel in sizes for ¼" and ⅜" O. D. tubing.

2. Flow resumed instantly and vacuum tight seal assured when connection is made.

3. Light, compact, streamlined design. Occupies little space. For use with portable equipment, and bulkhead or panel applications.

4. Instant-acting seals completely prevent loss of pressure when fitting is disconnected.

5. No twisting, turning or wrench action necessary. Easy straight-line finger tip pull or push action for instant connecting or disconnecting.

In the Boeing Airplane Company photo shown above, the tubes are instrumentation pressure lines running from the large jet engines on test stands to the patch board, where the lines are coupled into measuring devices.

The Boeing Airplane Company adopted this positive Swagelok Quick-Connect Fitting to simplify test installations, and substantially cut down test set-up time. Both ends of the many pressure lines are Swagelok-equipped. Previously, engineers used a screw-type fitting which required a wrench and valuable time-consuming operations to tighten and remove.

Swagelok engineers are equipped with experience, ability, and a wide range of tube fittings designed to meet your individual problems. Quick delivery of Swagelok tube fittings from local distributor stocks.

Swagelok® TUBE FITTINGS

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Crawford Fittings (Canada) Ltd., Niagara Falls, Canada

For more information on product at right, specify 1019 see information request blank opposite last page.

New Amendment slams brakes on food additives

The Food Additives Amendment of 1958 is now in effect with respect to all food additives except those in commercial use prior to 1958. This means that any foods which may contain a food additive used for the first time after January 1, 1958, will be in violation of the new law unless FDA permission has been obtained.

Packaging materials are the latest product area to get FDA attention. Following a complaint by the State of Minnesota that tinted, lined, and checked film packaging materials tended to deceive or mislead consumers, FDA investigated, agreed, and has embarked upon a cooperative program with industry groups involved.

Before marketing or using a film which might turn out to be objectionable, check with your industry trade association or with the FDA.

Depletion allowances face new threat

The subject of depletion allowances is sure to come under serious Congressional attack. If no final action is taken, observers are betting that the next Congress almost certainly will legislate reductions unless industry groups involved can make a strong case.

Often considered an exclusive preserve of the petroleum industry, which enjoys a 27½ percent deduction, several other industry groups now stand to be adversely affected by any legislation aimed at depletion allowances.

Proponents of legislation to reduce depletion allowances feel that oil men alone would pay an additional $420 million into the Treasury if allowances were cut to 15 percent. Sen. William Proxmire (D., Wis.) is ready to propose sliding depletion allowances based on gross income.

Supporters point out that a reduction will probably mean

See why ALCOA ALUMINUM makes a good design habit

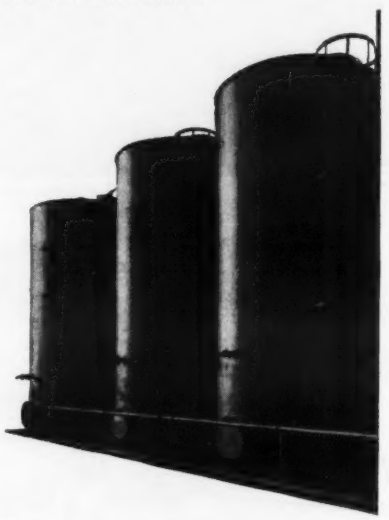
Requirement: A better way to store process liquids and gases

Key to Good Design: Use Alcoa Aluminum Storage Tanks

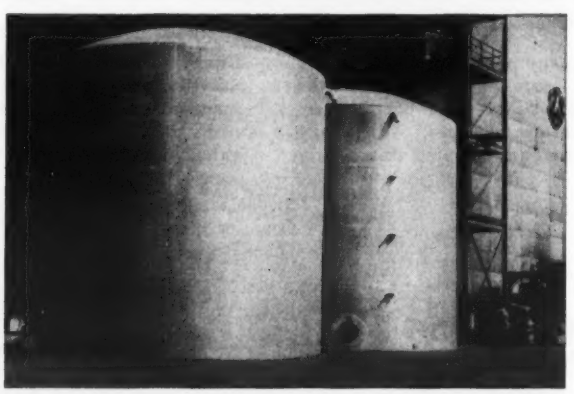
Whether product storage is an intermediate or final step in your processing operation, ALCOA® Aluminum Storage Tanks can help cut costs and maintain product purity. The production of glacial acetic acid is a prime example. For over 30 years ALCOA Aluminum tanks have been specified for storing this chemical because they resist corrosion and offer real economies in initial investment and in freedom from maintenance costs.

Thousands of aluminum tanks and tank cars have been constructed for the transport and storage of such chemicals as ammonium nitrate solutions, acrylonitrile, cryogenic substances and sour crude oils. Some of the many other products for which aluminum alloy tanks are well suited are listed below.

ALCOA can supply aluminum storage tanks for practically any processing application. They are made in a number of sizes ranging from 580 to 21,480 gal and are available in both horizontal and vertical construction.



Oleic acid is one of the many chemicals often stored in aluminum tanks. Aluminum preserves the color and purity of this product.



These aluminum storage tanks maintain the purity of steam condensate for a large public utility.

Fabricated from 3003 aluminum alloy, ALCOA Standard Storage Tanks measure 10 ft in diameter with varying lengths for different capacities. ALCOA also supplies special storage tanks to many processors. These can be furnished in intermediate lengths and capacities, and in a wide range of aluminum alloys for many process applications.

ALCOA engineers have worked closely with all segments of the process industries for over 40 years, and can help you specify the aluminum alloy storage tanks and other equipment best suited for your particular process application. ALCOA's unparalleled experience in this field is available to you for the asking. Write to the address on the coupon, stating your requirements as specifically as possible. ALCOA's development engineers will welcome the opportunity to work with you on your problems.

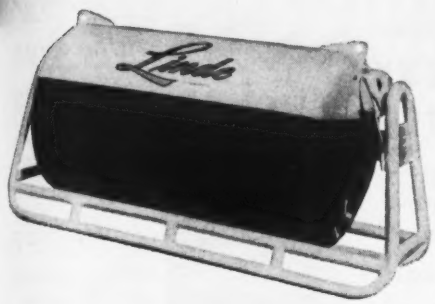
You can also take advantage of the wide selection of free ALCOA literature on aluminum for storage tanks and other process applications. Simply check the booklets you want on the coupon and mail to the address indicated. ALCOA will forward your material promptly and without obligation.

During 1959, ALCOA will conduct engineering conferences in a number of major cities on process industries applications of aluminum. Contact your nearest ALCOA sales office for full particulars and dates.

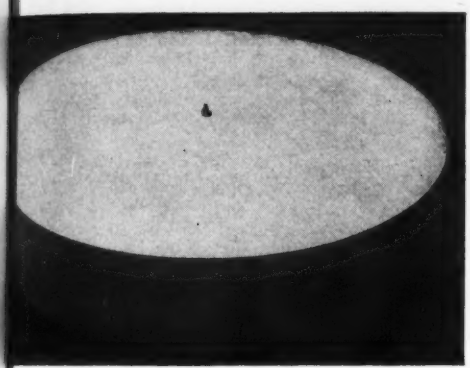
Typical chemicals stored in ALCOA tanks

Acetaldehyde
Acetic acid, glacial
Acetic anhydride
Acetone
Acrylic acid, glacial
Acrylonitrile
Adipic acid
Ammonium carbonate
Ammonium nitrate solutions
Ammonium thioglycolate
Amyl mercaptan
Animal oils
Benzene
Butyl alcohols
Cellulose acetate
Edible oils
Ethyl acetate
Ethyl alcohol
Ethylene glycol
Fatty acids
Gasoline
Glycerine (natural & synthetic)
Glycerol phosphate
Lacquer
Methyl alcohol
Napthenic acids
Naval stores
Nitric acid (above 82% conc.)
Nylon salts
Oleic acid
Phenol
Propyl alcohols
Propylene glycol
Resins
Rosin
Sorbitol
Solvents
Stearic acid
Sugar solutions
Toluene
Trichlorobenzene
Turpentine
Water (distilled or deionized)
Waxes

Fatty acids are not discolored by contact with aluminum.



Aluminum's light weight assures easy handling and storage for this 600-liter nitrogen container. The tank is fabricated from Alcoa Aluminum Alloy 5154.



The world's largest all-aluminum tank stores 2⅓ million gal of ammonium nitrate at 180°F. Prime consideration here was the need for uninterrupted storage service with a minimum of maintenance. The tank stands 26 ft high, and has a diameter of 128 ft.

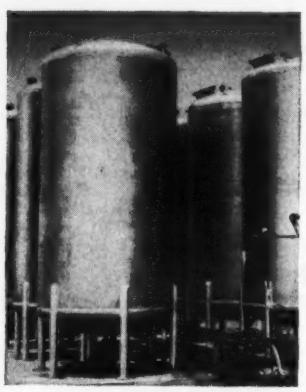
Typical mechanical properties of Alcoa Aluminum Alloys

Alloy and Temper	Tension			Hardness, (2)	Shear Ultimate ksi	Fatigue Endurance Limit, ksi	Modulus of Elasticity ksi
	Strength, Ultimate	ksi Yield	Elongation % in 2 in. (1)				
5052-O	28	13	25	47	18	16	10,200
5083-O	42	21	22	73	26		10,300
5086-O	38	17	22	65	23		10,300
5154-O	35	17	27	60	22	17	10,200
5454-O	36	17	22	62	23		10,200
5456-O	45	23	24	75	28		10,300

(1) ⅛-in. thick specimen
(2) Brinell; 500-kg load, 10-mm ball

ASME design stress values for various Alcoa Aluminum Alloys (psi at 100 degrees F)

5052..... 6,250 psi
5083.....10,000 psi
5086..... 8,700 psi
5154..... 7,350 psi
5456.....10,500 psi



Alcoa standard tanks are constructed of stock components and are available for fast delivery. They provide the safest storage for a wide variety of chemicals, petrochemicals and petroleum products.

ALCOA ALUMINUM
ALUMINUM COMPANY OF AMERICA

For exciting drama watch "ALCOA THEATRE," alternate Mondays, NBC-TV, and "ALCOA PRESENTS," every Tuesday, ABC-TV

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872-D Alcoa Building, Pittsburgh 19, Pa.

Please send me the following literature covering Alcoa Aluminum for storage tanks and other uses in the process industries:

☐ 10387 Alcoa Standard Storage Tanks
☐ 10460 Process Industries Applications of Alcoa Aluminum
☐ 10508 Cleaning and Maintenance
☐ 20849 Resistance of Aluminum Alloys to Weathering and Resistance of Aluminum Alloys to Chemically Contaminated Atmospheres
☐ 20265 Have You Tried Aluminum in Your Refinery?
☐ GL93 Aluminum in the Pulp and Paper Industry
☐ 20268 Resistance of Aluminum Alloys to Fresh Waters

Name.....

Company..... Title.....

Address.....

City..... State.....

Check 1020 opposite last page

an increase in price of crude petroleum, which most likely will be passed along to the consumer. It might also mean a reduction in exploratory drilling.

AEC under fire

The Atomic Energy Commission is coming under considerable fire. In the past few months it has:

1. Announced cutbacks in purchases of uranium. This has antagonized, among others, the Canadian government.
2. Announced it will not renew existing lithium contracts, thereby seriously jarring domestic lithium producers.
3. Submitted a budget calling for fewer new atomic reactors than in the past. This drew Congressional fire on AEC Chairman John McCone.

Much of the recent criticism stems from increasing concern that the United States reportedly has fallen behind USSR in missiles, rockets, and basic nuclear technology.

"This is Chemical Progress Week . . . and just look at you!"

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WHERE TIME, space limitations and cost-saving are factors, a "Screw-Lift," "Screw-Veyor" conveying system is your logical answer. It gives you a dust-tight, moisture-tight, clean and efficient means of handling wet or dry materials from receiving point to storage, and/or to and from processing to storage or to ultimate packing — *automatically and without attention.*

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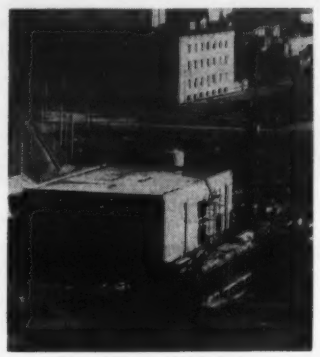
nuclear notes

Significant news about atomic energy



Italian reactor facilities near completion

Scheduled to begin operating this summer, facilities for 50,000 watt atomic research reactor are nearing completion at the Enrico Fermi Nuclear Study Center in Milan, Italy. The solution-type reactor, designed and built by Atomics International, a division of North American Aviation, Inc., will be used for research in physics, chemistry, and engineering.

Firms withdraw proposal to build A-power plant

The Pennsylvania Power and Light Company and the Westinghouse Electric Corporation have withdrawn their proposal to build a nuclear power plant, according to announcement made by AEC. Cost of project to the companies and AEC would have been about $108 million.

Radioisotope demand up at Oak Ridge

Amount of radioisotopes shipped from AEC's Oak Ridge National Laboratory for use in peaceful applications of nuclear energy increased 37% during 1958. Total of 228,717 curies were shipped during 1958, compared to 166,652 during 1957. Sales returns decreased from $2,599,284 in 1957 to $2,438,169 in 1958, reflecting

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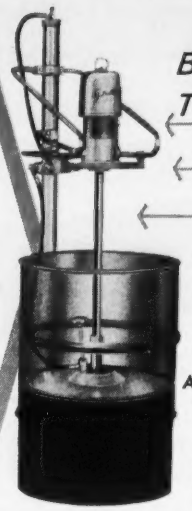

And 100's of other hard to handle materials.

Cleans your drums at the same time!

● This new, air-operated pump and forced induction plate completely seals in the material, prevents contamination, spillage, channeling and waste. Eliminate slow hand operation and messy transfer of difficult material!

You paid for all of it . . . now get all of it! Graco Inductors move from top to bottom, scrape drum sides entirely clean, get *all* material from drum. Sizes for 55 gal. drum, half drum or 5 gal. pail. Write today for details!

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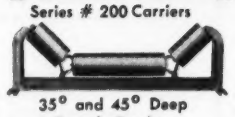
MORE QUALITY ENGINEERED FEATURES IN STEPHENS-ADAMSON CARRIERS

Series # 200 Carriers

Series #700 Carrier



35° and 45° Deep Trough Carriers

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ADVANTAGES

- Spun-end roller assemblies and parts interchangeable for quick installation.
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- Roller brackets tilt two degrees in direction of travel for greater belt training effect.
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S-A

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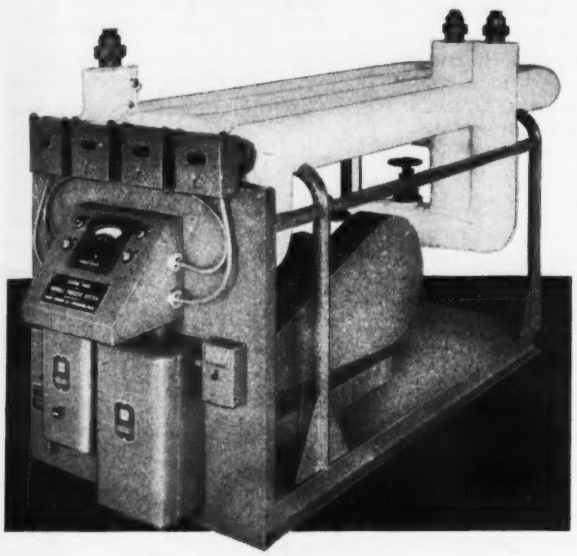
HI-TEMPERATURE LO-PRESSURE

liquid phase heat transfer systems



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—Your product temperature requirements are high

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—You need close temperature control and safe, automatic operation at reasonable cost . . .

. . . . You should consider a space saving, all electric, Merrill Process System. Heating mediums can be Oil, Aroclor® or Dowtherm®.

A twist of the wrist puts these systems into operation—and they will hold fluid temperatures to within ±2°F. within the range of 200-600°F.

Heat exchangers can be factory mounted and piped when a cooling cycle is required.

Dual systems are available having two completely independent circuits with separate control systems providing heating and/or cooling in sequence, simultaneously, or in any combination in the same unit.

Low watt density finned heating elements protect the heating medium and are readily accessible for routine maintenance. Relief valves, limit switches and positive displacement pumps assure safe, dependable operation. An expansion tank, vented to atmosphere, precludes contact of air with the circulating medium and prevents pressure build-up.

All of the Electric Merrill Process Systems have push button operation from a single control center.

Capacity of available systems ranges from 25,000 Btu/hr. to 500,000 Btu/hr. or up to limits of available power. Heating elements wired for 230-3-60 only in Pilot Plant series to 100,000 Btu/hr., and 230,460, or 550-3-60 in larger units. Control circuit is for 110V 60.

Write for Bulletin 597 giving details of the Pilot Plant Series or send us your requirements.

Parks-Cramer Company

FITCHBURG 12, MASS.

Check 1025 opposite last page

reduction in prices for cobalt-60 effective August 1, 1957. Total of 14,131 shipments were made in 1958. Of these, 552, valued at $467,917, went to some 28 foreign countries. Japan received largest number.

During late 1958 the laboratory also began shipments from the multicurie fission products pilot plant, a facility for recovering usable radioisotopes from reactor fuel element processing wastes. First material from plant was used as part of 2000 curie cesium-137 source for teletherapy machine at a California medical research center.

Nuclear option offered to ChE's at Lehigh

A course dealing with experimental work in nuclear reactor engineering has been added to the chemical engineering curriculum at Lehigh University. Included are studies in neutron diffusion in the sub-critical reactor, liquid-metal heat transfer, nuclear fuel properties, processing.

Extra-clean conditions for nuclear pumps

A special "clean room" for final assembly of nuclear and cryogenic pumps has been put into service by Byron Jackson Pumps, Inc., a subsidiary of Borg-Warner Corp. Completely air conditioned, room has about 1500 sq ft of floor space. Walls and ceiling are fully insulated with reflectal aluminized sheets and covered with dust-repellent siding. Air entering room is completely filtered. Both temperature and humidity are closely controlled.

Employees must pass through a "change room" before entering room. They are required to wear special shoes and buttonless white smocks. Numerous other precautions are taken to insure maximum cleanliness. Room is used primarily for final cleaning, assembly, and packaging of custom-built pumps.

So SIMPLE
We Can
Adapt It
to ANY
LIQUID LEVEL
CONTROL JOB
A sleeve, raised and lowered within a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Basically, this is Magnetrol.
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● No matter how specialized the liquid level control application, adapting Magnetrol to meet it presents no problem. Whether it's for high pressures, high temperatures, corrosive liquids or any other condition, a few "standard" modifications and the job is done! Operation is so simple no changes in basic design are needed. That's why Magnetrol "fits" practically any application — why "specials" are so often standard with us.

Because of the utter simplicity and dependability of its magnetic principle, Magnetrol has *infinite operating life.* There are no wearing parts to get out of order.

Magnetrols are available for controlling level changes from .0025-in. to 150-ft., with single or multi-stage switching. Our experienced engineering staff is at your service.

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WHY NOT MAIL THE COUPON — NOW

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Please send me catalog data and full information on Magnetrol Liquid Level Controls.

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Company_____

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City_____ Zone____ State_____

Check 1026 opposite last page

How to chop 13 weeks off a startup date

Hustling a new plant into operation, engineers at a western manufacturing company were badly pressed for time.

Needed almost immediately were two large heavy-duty mixers for fluids.

A long wait would mean soaring standby expense, lost income, a decisive edge for competition. And the usual manufacturing time for the mixers they needed was *16 weeks.*

One of the engineers phoned a LIGHTNIN Mixer representative. He, in turn, phoned the MIXCO factory. How soon could we ship two 50-horsepower LIGHTNIN Mixers, each equipped with a turbine impeller big as a dining-room table on a shaft 18 feet long, 4½ inches in diameter? And could we supply the lower shafts and impellers *with rubber covering?*

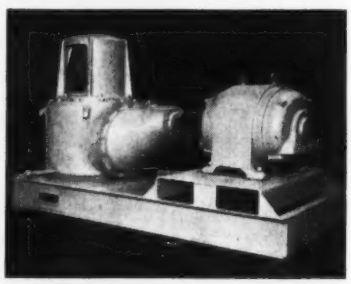
Six tons in 18 days

His call set off a swift, far-reaching chain reaction. Just 18 days later, we put nearly six tons of mixers aboard a fast truck—both units completed and shipped *13 weeks ahead of normal.*

Magic? No—just speed. We're set up for it because we build nothing but mixers. We build them fast when you need them fast—because we stock a tremendous range of mixer components and parts, in materials that match just about any process requirement.

And we have the manpower, the machines, and the know-how to give you the right answer to any fluid mixing problem in your plant. Rapidly.

For competent engineering help, call your LIGHTNIN Mixer representative (you'll find his name in Chemical Engineering Catalog). Or write, wire, or phone us direct.



PAYOFF for engineer in a hurry: two 50-hp LIGHTNIN Mixers like this one—built in 18 days.

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In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Ave., Toronto 19, Ont.

Check 1027 opposite last page

NUCLEAR NOTES

Economic radiation sterilization machine

Relatively low-cost, high voltage electron accelerator has been placed on the market. Designed primarily for pharmaceutical sterilizing applications, machine is available in two sizes — 1.5 mev with 15 kw of beam current and 3 mev with 30 kw. Beam penetrating power is estimated at 0.33 cm per mev for a material of unit density. This can be boosted to 0.81 cm by splitting beam and irradiating both sides of product.

(Manufactured by Radiation Dynamics, Inc., electronic accelerators are being marketed by Wilmot Castle Co., 1929 East Henrietta Road, Rochester, New York.)

Check 1028 opposite last page.

Power level upped 10X on research reactor

Armour Research Foundation of Illinois Institute of Technology has boosted power level of its nuclear reactor to 100,000 watts, making it the largest of its type in the world. The reactor was the first built in U.S. for private industrial research. Maximum power permitted previously was 10,000 watts.

Costs rise $380 million for AEC in 1958

AEC's 1958 financial report lists cost of operations including depreciation, totaling $2291 million. This is a boost of $380 million over fiscal year 1957. Increases during year included $200 million for purchase of raw materials, $107 million for weapons research and fabrication, and $56 million for reactor and other research programs. Investment in production plants, research laboratories, and other facilities rose to $7.1 billion, from $6.9 billion at beginning of year.

(AEC financial report, 1958, may be obtained by writing to U. S. Atomic Energy Commission, Washington 25, D. C.)

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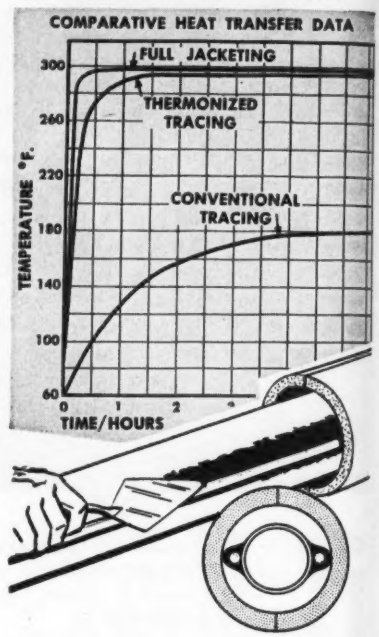
Thoroughly proved

HEAT TRANSFER MEDIUM

now effecting savings up to 90% for over 700 users!



Thermon is a non-metallic plastic compound with highly efficient heat transfer properties, and is easily applied over either steam traced or electrical resistance systems . . . working equally well for either heating or cooling processes.

Thermonizing has excellent heat transfer characteristics (see curves), exceeding steam traced equipment approximately 1100%, and closely approaching jacketing equipment. Thermon can be used almost without exception in place of expensive jacketing (and in many applications where jacketing is impossible), with savings up to 90%.

Write for complete technical literature on revolutionary Thermon!

THERMON MANUFACTURING CO.

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Check 1029 opposite last page

THAT'S INTERESTING

Sun powered seismograph

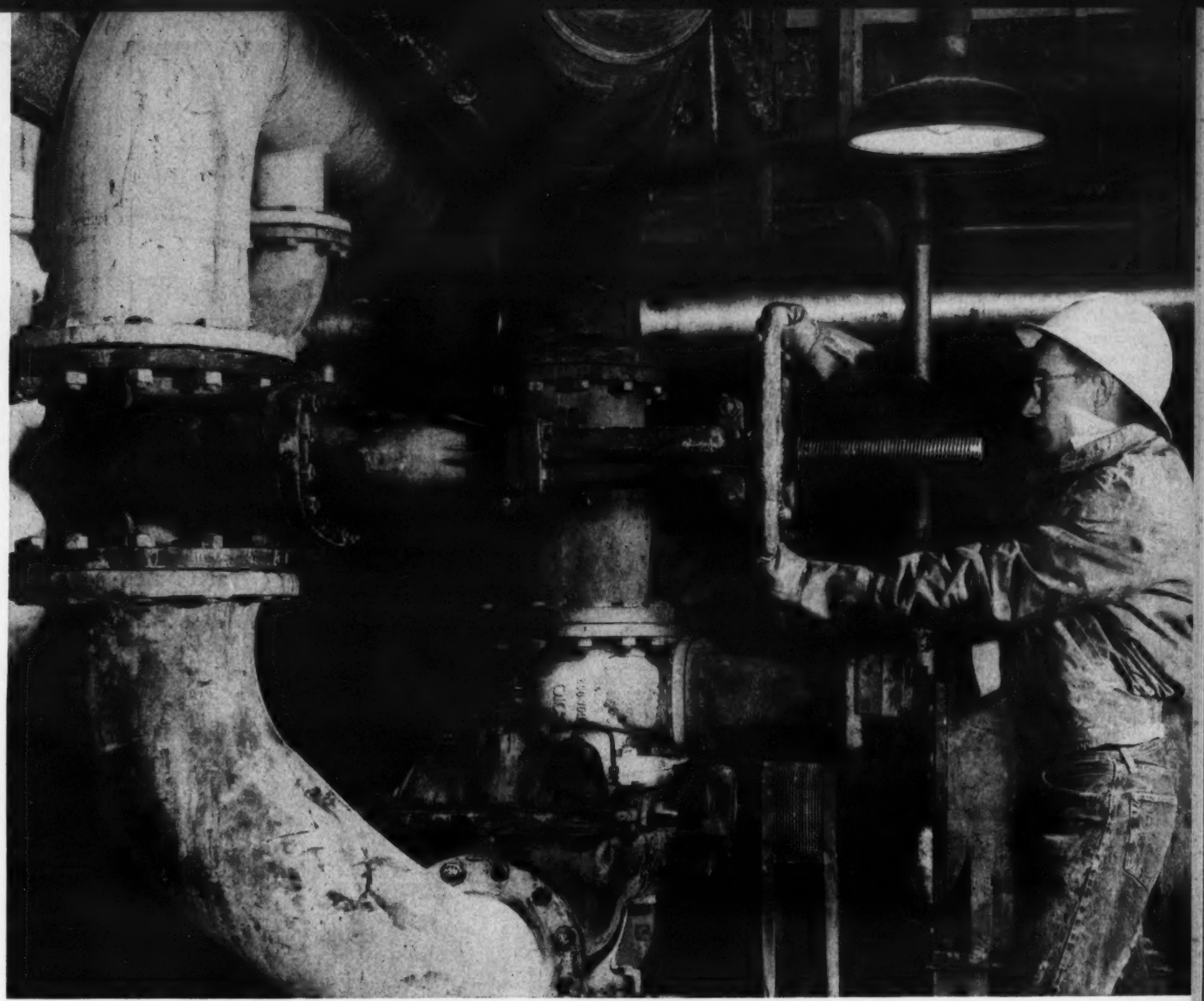
Weighing only 15 lb, new all-transistor seismograph developed by Texas Instruments has power demand so low that 8 x 15" solar converter can keep its battery charged. It will be a boon for petroleum exploration crews in rough, inaccessible terrain. (*ISA Journal*)

C-ration missile

Troops in future wars may have food literally shot at them via ballistic cargo missile. "Lobber," a development of Convair Division of General Dynamics Corp., also designed to hurl medicine, communications gear, and ammunition. Can be carried, launched by three men.

Rainmaker?

If a picnic this summer is washed out, you can blame meteor dust. Australian and U. S. scientists are studying the possibility that these cosmic fragments cause rain. They also believe that study of this dust may be a more accurate means of predicting rain.



This 4000 gpm Stainless Steel pump has circulated acidic water for four years. It has needed no maintenance.

Stainless Steel equipment cuts replacement costs 75%

AT INTERMOUNTAIN CHEMICAL COMPANY, WESTVACO, WYOMING
operated by WESTVACO CHLOR-ALKALI DIVISION, FOOD MACHINERY & CHEMICAL CORP., NEW YORK

"Hot alkaline crystal slurry ruined our 10,000 gpm pumps after only two years of service," says Mr. Reinert Kvidahl, Operating Superintendent at Intermountain's soda ash plant. "These pumps corroded and leaked. We replaced them with Stainless Steel pumps three years ago, and today they're still in excellent condition. They show no wear at all and no corrosion.

"We also had a 4000 gpm pump that moved acidic water. It needed major repairs in only six months. We replaced it with a Stainless Steel pump that has been in service for four years now and has never needed maintenance.

"Carbon dioxide and other acidic vapors corroded our barometric condensers. We replaced them with Stainless Steel condensers and we've had no more trouble.

"There are many such cases all through this plant. Wherever we had corrosion maintenance problems, we have replaced equipment with Stainless Steel—in pipes, valves, flex joints, filter leaves, linings, even nails and bolts. Because the Stainless resists corrosion and lasts years longer, we've saved more than 75% in replacement costs in spite of the higher initial cost of the Stainless."

End corrosion losses and frequent replacements in *your* plant. Replace with Stainless Steel. And specify USS Stainless Steel for service-tested quality.

USS is a registered trademark

USS

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

Nuclear merchant ship's fuel shipments start

First load of enriched uranium dioxide scheduled for use in the world's first nuclear merchant ship, the N. S. Savannah, has been shipped by Mallinckrodt Nuclear Corporation to The Babcock & Wilcox Company. Material, in powder form, will be compressed into pellets by B&W for incorporation in fuel elements. Product is enriched to slightly more than 4% in U-235. Mallinckrodt will ship 20,000 lb of uranium dioxide to B&W's nuclear facilities plant during next few months.

Super service started for film badges

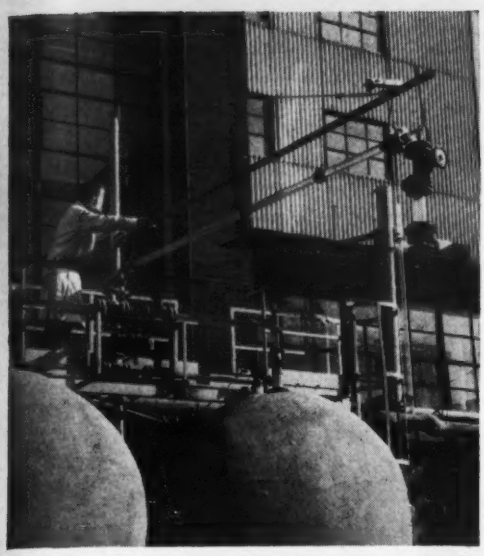
Film badge service featuring continuous cumulative dosage reports for each subscriber, plus 24-hour exposure reports (on request), is now available. Special dosimeter film registers radiation ranges from softest stray, scattered, and beta radiation to high-energy gamma and X-ray (25 to 300,000 mr) over wide spectrum of energy levels. Fresh film is mailed to clients each monitoring period, so that subscribers need not store film on their premises and run risk of spoiling or contaminating it before use.

(Further information about film badge service may be obtained from Atomic Film Badge Corp., subsidiary of Atomic Accessories Inc., 244-02 Jamaica Ave., Bellerose 26, New York.)

Check 1030 opposite last page.

Study fluid-bed technique in uranium recovery

Fluid-bed process is being developed at Argonne National Laboratory to recover uranium from enriched uranium-zirconium fuels. In the process, fuel is dissolved in a hydrofluoric-nitric acid system followed by fluidized bed drying and fluorination. Uranium is decontaminated and re-



Special swivel booms of glass, along with 200 feet of 2-inch PYREX brand glass pipe, handle organic acid chlorides at this outside storage and unloading station.

◀ At the Trubek Laboratories, Incorporated, East Rutherford, N. J., 1000 feet of 1-inch and 200 feet of 2-inch PYREX brand glass pipe are used in a four-component continuous reaction system for handling chlorine, HCl, and corrosive organics.

It's easy to install. Almost any plumber, or your own maintenance men, can install glass pipe, quickly and easily.

Now available: The new PYREX brand glass Y-valve in 1½" and 2½" sizes. Write for Bulletin PE-4.

Inside and out... at Trubek Labs they

TAME TOUGH CORROSIVES with PYREX® glass pipe

INSIDE Trubek Laboratories, Inc., you'll find a four-component continuous reaction system for handling chlorine, HCl, and a number of corrosive organics.

Part of this system is piping—1000 feet of 1-inch and 200 feet of 2-inch PYREX brand *glass* pipe. Also included are PYREX brand glass Y-valves and Shell and Tube Heat Exchangers.

OUTSIDE at Trubek, you'll see an acid chloride storage system and tank truck unloading station. Here you'll find an additional 200 feet of 2-inch PYREX pipe, as well as special swivel booms made from glass.

Why does Trubek pick *glass* pipe for taming tough corrosives? Because this pipe is made from PYREX brand glass No. 7740. This is the glass that is resistant to more acids and acidic materials than any other pipe. It's the same glass in which laboratory tests for the chemical durability of other corrosion-resistant materials are generally carried out. And you are assured of product purity because PYREX pipe does not contaminate even the most sensitive product. ● And, you can *see* what's going on in every inch of PYREX pipe. Should blockage occur—a rare happening because glass is so *smooth*—you can quickly spot it, without costly downtime and dismantling.

Is glass pipe fragile? Not PYREX pipe because it's made to stand up to high temperatures, pressure, and considerable mechanical shock.

How about costs? If you consider that installing glass often requires less time than other materials, you can start with at least one saving. But the *big* economy comes from the fact that glass *lasts*. Example: One firm reports that, after 9 continuous years of piping chlorine through 1600 feet of PYREX pipe, they had no corrosion at all. And maintenance had cost only $6.32 per year.

Why not put all the facts and figures about pipe for handling corrosives at your finger tips. Send for Bulletin PE-3, "PYREX brand 'Double-Tough' Glass Pipe and Fittings." Use the coupon for quick action on your request.

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Please send me: ☐ PE-3, the manual on PYREX brand glass pipe.
☐ PE-4 on the all-glass Y-valve.

Name.....

Title.....

Company.....

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City.....Zone.....State.....

Check 1031 opposite last page

covered as uranium hexafluoride, using volatility distillation technique. Potential advantage is that smaller volume of waste is produced as a solid, with resulting possibility of lower operating costs.

West German firms plan A-powered ship

According to an agreement reached by West German firms, a 10,000-hp nuclear-powered merchant ship will be developed by INTERATOM for Gesellschaft fuer Kerenergie in Shiffbau and Schiffahrt (Company for Atomic Powered Ship Development). Ship will be propelled by an organic moderated reactor, a nuclear reactor concept which has been successfully tested in the U. S. by Atomics International, a division of North American Aviation, Inc.

Nuclear fuel company formed by Mallinckrodt

Separate company has been established by Mallinckrodt Chemical Works to carry out its privately-owned nuclear fuel business. Known as Mallinckrodt Nuclear Corporation, the wholly owned subsidiary has taken over facilities and personnel of the Mallinckrodt Special Metals Division. Facilities include $2 million fuel production center at Hematite, 45 miles south of St. Louis.

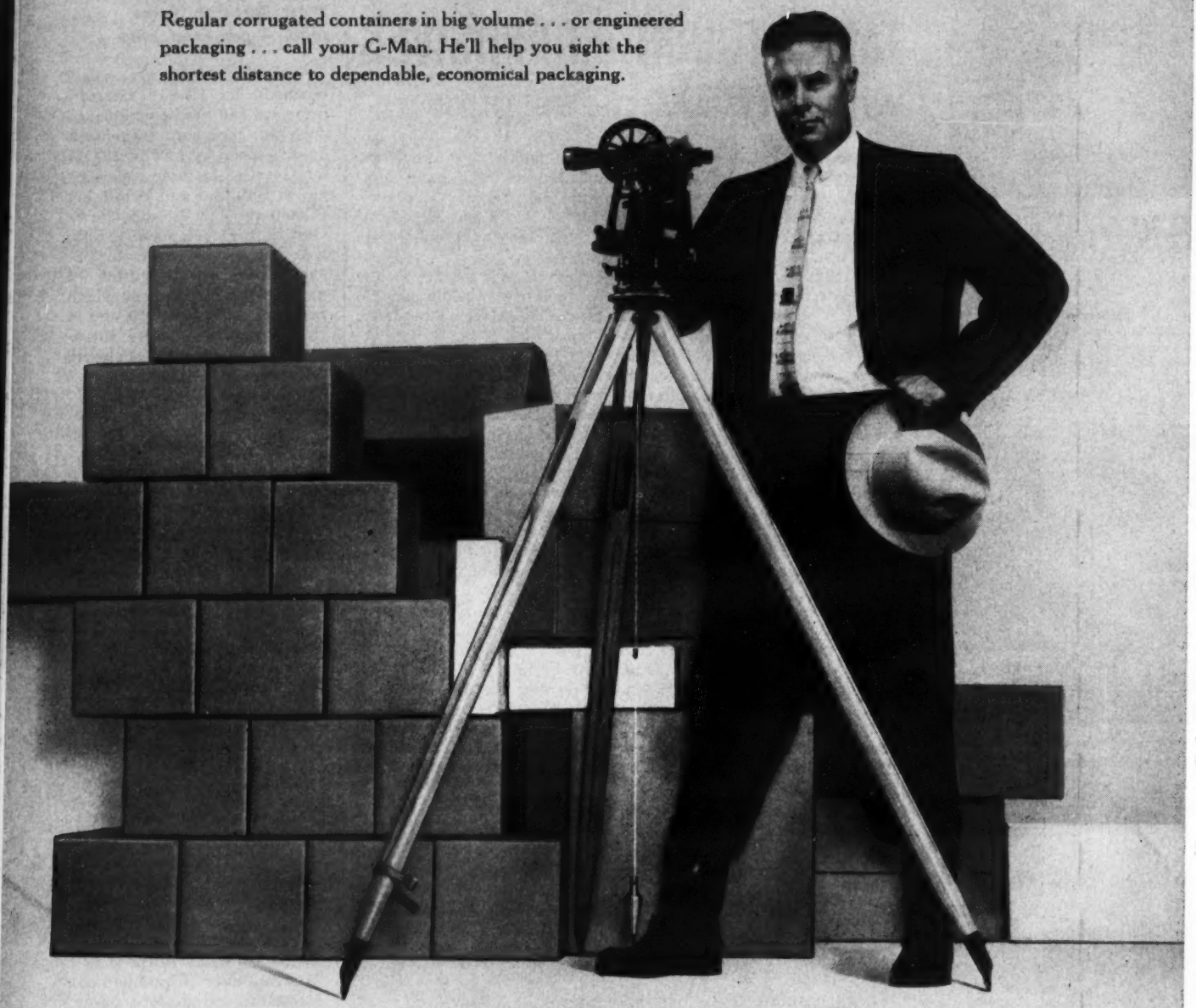
AEC offers aid to schools in radioisotope training

Program of financial assistance to colleges and universities for training in radioisotope technology has been established by AEC. Purpose is to boost number of qualified personnel needed to support growing industrial use of radioisotopes and nuclear radiation. Program provides direct assistance for purchasing demonstration apparatus, student laboratory equipment, and training aids needed to offer adequate laboratory course work in the field.

GAYLORD SIGHTS IN ON YOUR PACKAGING OBJECTIVES

Gaylord first surveys your packaging and handling operations. Then research and engineering team up to evaluate findings, coordinate results with newest Gaylord packaging developments . . . and recommend corrugated containers of highest efficiency, at lowest cost.

Regular corrugated containers in big volume . . . or engineered packaging . . . call your G-Man. He'll help you sight the shortest distance to dependable, economical packaging.



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PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**

For more information on product at left, specify 1032 see information request blank opposite last page.

Ingenuity and perseverance have carried Foster Grant from a pioneer molder to a leading producer of plastics raw materials. And it looks like the sky's the limit as . . .

Manpower, Research Are Beefed Up in Search for New Products, Uses

In the plastics industry, where spectacular developments are almost commonplace, one new star seems to stand out from the rest — a company that in a relatively few years has transformed itself from a molder of plastics products to a large-scale producer of plastics raw materials.

The company is the Foster Grant Co., Inc., Leominster, Mass. In four years, it has made itself a significant factor in the plastics material field — third in the nation in polystyrene production, No. 2 in the manufacture of Nylon 6. FG now is beginning production of acrylonitrile copolymer, its latest venture.

At first glance, the plastics field would appear to be as unlikely a spot as could be found for a relatively small firm to seek greater fortune. Foster Grant's sales of $8 million in 1952 seemingly would argue against chances of success in this booming industry. But the company's past history as a molder and extruder of plastics gave it a marketable asset that larger competitors could not hope to match.

Foster Grant began its corporate history in 1919 in Leominster as a maker of combs and hair ornaments. It might have remained a small company but for the ingenuity and perseverance of two of its founders — Sam Foster and his son, Joseph C. The latter now is company president.

Injection Molding Machine

It was the Fosters who succeeded, in 1931, in adapting a German-designed machine to use cellulose acetate, thus producing the first successful injection molding machine. Key factor in the adaptation was introduction of a separator in the machine.

As a pioneer injection molder, Foster Grant also had to design and build its own molds, and even today it continues to make 70% of molds it uses.

From combs and hair ornaments, the company branched out into housewares and sunglasses. In the latter it is still the nation's leading manufacturer. In this field, among other things, FG supported and publicized findings of research into the effect of glare on eyes. It also pioneered modern styling and annual redesign to make sunglasses fashionable and attractive as well as useful.

By 1950, the men at Foster Grant realized the greatest growth potential lay in supplying plastics raw materials rather than in making finished products.

The company had begun compounding, in 1935, its own cellulose acetate (for celluloid acetate sheets then used in molding) from the flake. The move was undertaken because Foster Grant felt it could obtain better control of its own formulations by making the material itself, and save money in the bargain. Its hopes were realized and, with its own compounding facilities, the company was able to vary physical properties, thus obtaining what amounted to custom products for its use.

◀ Polystyrene is inspected by Foster Grant employee as it leaves extruder at Leominster, Mass., plant and enters cooling bath near final stage of production

Polystyrene Production

The real turn toward its new field occurred in 1950 when polystyrene manufacture

began. The company then was the nation's largest single user of polystyrene. There was a substantial price differential between monomer and polymer and between polymer and the completed plastic material. Studies satisfied the company it was economically justified in producing its own polystyrene.

The polymerization plant was designed and engineered by the company, based on Foster Grant pilot plant studies. It made use of newly developed polymerization methods.

A suspension polymerization-type system is used in the manufacture of the company's Fostarene polystyrene molding powders. Suspension polymerization is generally recognized as being superior to other well known methods, such as bulk, solution, and emulsion polymerization because of improved product uniformity and improved product properties.

The process permits close control of temperature and composition, thus making possible the production of molding materials with specific properties important to their end use.

When the new plant went into production at Leominster, its capacity was 4 million lb annually. It has since increased more than 10-fold. Approximately 90% of polystyrene (Fostarene) and high impact polystyrene (Fosta Tuf -Flex) produced is sold to molders. The Leominster plant also contains facilities for producing colored polystyrene in a variety of hues.

Builds Monomer Plant

Foster Grant's next move was to build a monomer plant at Baton Rouge, La., to supply a basic polystyrene ingredient. The plant went on stream in 1954. It uses the standard ethylbenzene reaction. Original capacity was 15 million lb annually — a figure that has been increased through plant additions to around 85 million lb, with further expansion in progress.

About 50% of the monomer is used by Foster Grant. The remainder is sold to the plastics and rubber industries.

In 1958, Foster Grant moved a step further with the introduction of Nylon 6 (caprolactam), known as Fosta Nylon. The company had been using Nylon 6 in its own molding operations, notably for sunglass frames. It obtained licenses from a German manufacturer (Farbenfabriken Bayer) to begin production of the polymer in this country. Nylon 6 is being produced at the company's Manchester, N. H., plant with an initial capacity of about 3 million lb a year.

Foster Grant is bullish on prospects of Nylon 6 for applications in the automotive, marine hardware, and packaging fields. One molder (Auburn Plastics) already is producing nylon marine propellers, which have proven superior to conventional metal propellers because of their resistance to salt water and abrasion.

Certain characteristics of Nylon 6 indicate it is desirable in auto speedometer gears, door latches for homes, and car windshield wiper gears.

Styrene Acrylonitrile

Scheduled for merchandising to molders this year is FG's new styrene acrylonitrile copolymer (Fostacryl). The company already has used the material in developing a beverage tumbler, and believes Fostacryl will find many uses in products that demand clarity, impact strength, and high resistance to solvents and foods.

With its burgeoning plastics material business, Foster Grant has shown enormous growth. Sales of $8 million in 1952 more than doubled by 1954, and the company has set its sights on the $30 million mark for 1959.

Recognizing the importance of research and development, FG is expanding its scientific work. It is beefing up both manpower and facilities it can bring to bear in developing new products and new uses for recognized plastics.

To this end, the company brought Dr. Raymond R. Hartigan, former director of research at Pittsburgh's Mellon Institute, into the company as vice president and director of research and development. A substantial number of new technical and scientific personnel have been added, and plans have been completed for new laboratories at Leominster.

Company officials acknowledge that basic research is being conducted in stereospecific polymerization catalysts, styrene copolymers, polyamide polymers and copolymers, polyolefins, and graft polymerization.

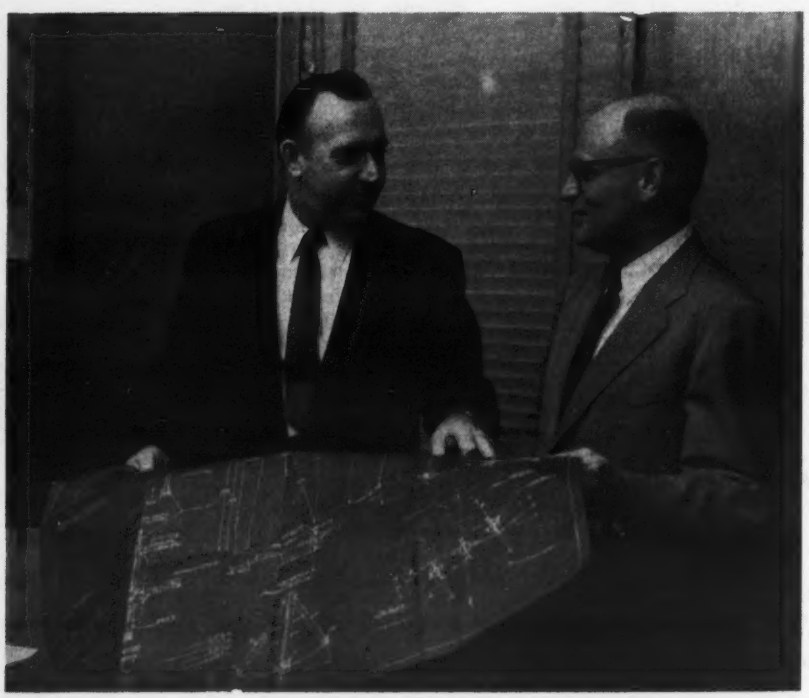
Service to Molders

Besides basic research, Foster Grant is relying upon its unique fund of molding technical know-how to consolidate and advance its position in the plastics material field. With its background, the company is able to give molders advice on techniques, equipment, costs, and merchandising.

Science's forward rush in the plastics field promises great things for the future. Foster Grant's president, Joseph C. Foster, is among those who believe the industry still is in its infancy both in opportunity and challenge. He says:

"Plastics and plastic products are being used today in fields that 15, 10, or even five years ago were considered beyond their capabilities. The economy of plastics, their ready adaptability to constantly changing styles and tastes, and in many cases their superior performance, gives all of us in the industry sound reasons for believing that what has been called a 'boom' is simply the beginning of our growth.

"As science and technology discover new materials, or new uses for plastics we now have, the industry will continue to provide more and better products to meet the needs of our way of life."

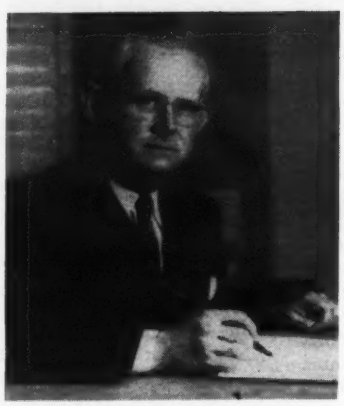


Further expansions of Foster Grant are discussed by Dr. Robert L. Purvin (left), executive vice president, and Dr. Sidney Baum, vice president, polymer products division

Uncle Sam believes that minimum costs and maximum benefits result when companies work together to increase technological knowledge. But Antitrust Division chief cautions that . . .

Cooperative Industrial Research Is Fine If Results Are Freely Available To All

VICTOR R. HANSEN, Assistant Attorney General
Antitrust Division, Department of Justice



One of the highest-placed men in the Department of Justice is Victor R. Hansen, who heads the important Antitrust Division. Recipient of a LLB degree from the University of Southern California, Mr. Hansen practiced law before both state and federal courts until his elevation to judge of the Superior Court of Los Angeles in 1951. He has been in charge of the Antitrust Division since mid-1956.

Mr. Hansen also is a graduate of the Army's Command and General Staff School. He was adjutant general for the State of California in 1944-46, and has been a brigadier general in the California National Guard since 1944. He is a regent of the University of California.

In recent years, development of our nation's scientific research resources has become a matter of deep concern. This research effort is the product of the combined activities of industry, universities, and the government. At least 70 percent of our scientific research is performed by industry.

Expenditures for industrial research were only $300 million in 1938, but by 1956 the cost had reached $6.1 billion. It is expected that industry will spend $9.3 billion on research next year.

Fullest development of industrial research efforts requires a proper "climate." I feel that that climate is created by unrestricted competition which spurs industrial effort in the market place, production line, and even in the research laboratory.

Growth of U. S. industrial research has resulted mainly from the growing importance of technological competition to satisfy the needs and wants of an ever-changing market. Because industrial research today has become a deliberate instrument of economic development, industries compete constantly to create new wants and new markets.

Industrial research by competitors can challenge the market position of a company by development of different raw materials and more efficient processes to manufacture the same product, and by development of different products to perform the same function. Such research also can serve as a powerful competitive lever for growth by producing new products to perform new functions, and by finding new uses for existing products.

Research Restraints

Accomplishments of industry in the research area have been rather extensive and varied. But there could be an even better record of achievement were it not for some restraints imposed upon the growth of research efforts by companies charged with antitrust violations.

In our experience, we have thus far found very few instances where companies have agreed directly to restrict research activities, although such practices are not unknown. In a recent antitrust action, two companies by written agreement curtailed the amount of research funds that each could expend in the development of a particular product.

The usual case involves a misuse of patent licensing agreements, a division of fields among companies, or a monopoly in the manufacture and sale of products. Such agreements or practices may have the effect of eliminating commercial incentives to spend large sums for research or to acquire promising inventions.

Companies tend to engage in research only in areas which would give them a particular commercial advantage. There is nothing wrong with this, unless the decision to restrict research to a particular area is required because of some agreement restrictive of competition.

There is very little point generally in a firm's doing much in the research area when, because of illegal agreements or practices, its developments will not be its own; when the firm cannot fully benefit from the commercialization of its discoveries, or when the firm already has a monopoly or dominant market position. Such a firm cannot benefit from its research discoveries in a particular area when it has entered into agreements which give to another company the right to exploit its inventions in this area.

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Container outlook . . .

Role of Plastics Looms Large in Future Merchandising Plans

A. J. DRAGONETTE
Project Manager, Packaging
New Product Engineering Department
Union Carbide Plastics Company

PLASTIC containers of bottle, can, and tube types will play an important role in the grand merchandising plan of the future, with substantial growth due in each of the present major markets of cosmetics, household, and pharmaceutical uses.

Increased use of plastics will tend to follow the general trend toward greater growth of packaging, even now an indispensable part of industry. It has been estimated that total dollar value of packaging materials will soar to $18 billion in 1960 — a $6-billion gain within a decade.

Three distinct types of plastic containers now exist. These are squeeze bottles, collapsible tubes, and rigid containers. Squeeze bottles and collapsible tubes are largely polyethylene, while rigid containers are largely polystyrene.

Thermosetting resins, mostly of the phenolic type, are the major plastic material used for closures. Polystyrene and polyethylene are showing substantial growth in the manufacture of closures, particularly in the tube and can field where their higher cost pays off in performance.

Early Development Stages

While a total of 55.5 million lb of polyethylene and polystyrene were used in containers in 1955, markets for the can, tube, and bottle type still are in early stages of development.

Major impetus to growing uses in the cosmetics, household, and pharmaceutical fields could result from improvement in container-material properties. These would include permeability to essential oils and higher collapse temperature.

With this improvement, more hair tonic, lotions, and oils will be packaged in plastic containers for cosmetic use. Household products such as nursing bottles, food condiment containers, and detergent cans also will be used more widely. Present estimates for light-duty liquid detergents place use at 800 million metal cans annually.

Semi-rigid plastic cans for liquid detergents are being test-marketed. Market reaction to date has been mixed. Strongest criticism can be summed up in three points:

1. Plastic can is presently more expensive (about 2c per unit.)
2. Consumer has difficulty metering out correct amount.
3. There is only one source of supply for these detergent cans at present.

An estimate for plastic bottles, tubes, and cans in terms of pounds of polyethylene resin is shown in Table 1, while estimated market for tubes is shown in Table 2.

Condensation of a talk given recently before the Society of Plastics Engineers, Inc., regional technical conference, at Hartford, Conn.

Table 1

Estimated Polyethylene* Requirements for Bottle, Tube and Can Containers

Year	Polyethylene (Million lb)
1955	10
1960	37
1965	70
1975	140

*All types

Vinyl resins, used extensively as coatings on paper and metal for many packaging uses, have only modest potential for plastic containers of the can, bottle, and tube type.

Cost of plastic containers is usually compared on a price per unit volume basis. Actual raw material cost is an important factor. Based on industry experience, raw material usually amounts to about 50% of finished container cost.

Table 3 shows the cost of selected plastics for containers, considered on the unit volume basis. Resin costs are based on average prices of general-purpose-grade materials.

Table 2

Estimated Market for Tubes
(million gross)

Types	1955	1960	1965	1975
Aluminum	3.9	4.6	5.2	6.6
Lead	2.3	2.0	1.7	1.0
Tin	1.1	1.1	1.0	1.0
Polyethylene, all types	0.3	1.8	2.1	2.8

Aerosol Cans

From the bug bomb of World War II there has grown a whole new field of aerosol cans. A constantly increasing variety of products are being

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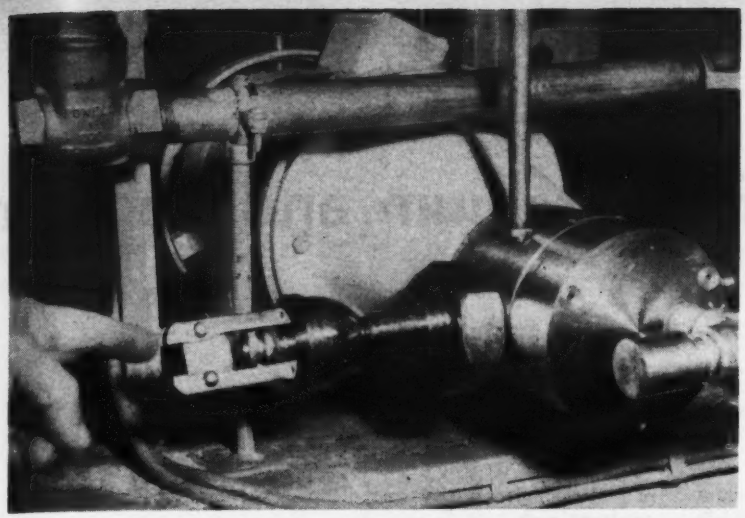
Table 3

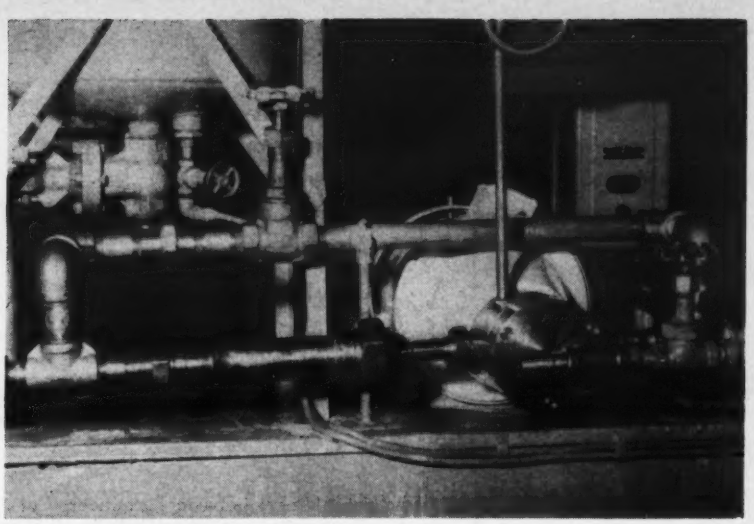
Cost of Selected Plastics for Containers

Material	Specific Gravity	Resin Cost* (cents/lb)	Cost/Cu In (cents)
Cellulose acetate	1.30	50	2.35
Cellulose acetate butyrate	1.28	62	2.87
Nylon	1.11	140	5.63
Polyethylene, low-density	0.92	35	1.17
Polyethylene, high-density	0.95	47	1.53
Polystyrene	1.05	25	.94
Polystyrene, Impact	1.05	32	1.24
Polystyrene-acrylonitrile	1.08	40.5	1.58
Vinyl chloride	1.40	27	1.35
Vinyl chloride-acetate	1.37	44	2.20

*Based upon published prices as of December 1957.



View of ultrasonic disperser blade with jacket removed. Gear pump at right forces material through jet onto edge of blade



Disperser assembled and ready for action. Small tank at left is used for experimental runs

Low-cost, maintenance-free unit — which disperses through use of sound waves — provides uniform particle size on regular production runs. Compared to large mill previously used for making emulsions, small . . .

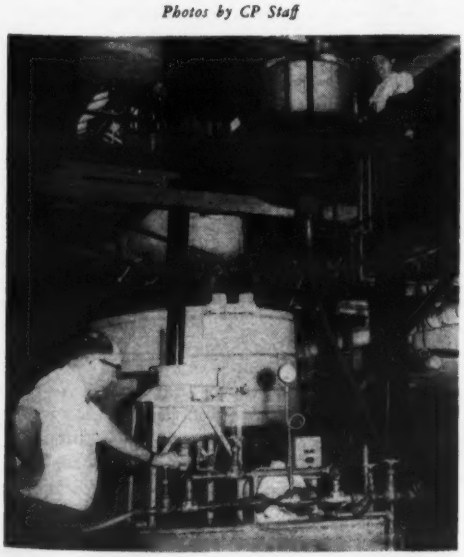
CP **NEW SOLUTIONS of processing problems**

Ultrasonic Disperser Gives Six Times the Production with Half the Horsepower

GORDON WEYERMULLER, Associate Editor
with **A. S. WITTNEBEL,** President
Comcolloid Incorporated, New York, N.Y.

Disperser being used for plant production run. Material is being fed from vessel at upper right

Photos by CP Staff



Problem: Two mills used for making emulsions at Comcolloid Incorporated each had a production rate of only about 50 gph. One of these mills used a 5-hp motor and the other a 7-hp motor. Mills were about 4½′ high and were quite heavy. They were used for making emulsifiers, polyethylene dispersions, and other colloidal systems for use in the paper industry.

Each mill required about $700 maintenance per year for refacing grinding surfaces, parts, and general maintenance. Emulsions produced had more variation in particle size than desired.

About a year ago plant was faced with need for increased dispersing equipment to meet higher production requirements.

Solution: Investigation showed that a mill of the required size would cost about $10,000. Since an ultrasonic disperser could be obtained for about $1500 that would meet requirements, such a unit was placed in service in January 1958.

Heart of this unit is a razor-thin blade about 1″ wide which is mounted between two prongs. It looks like a tuning fork. A stream of the liquid to be emulsified is increased to 150-250 psi pressure by means of a 2-hp gear pump. This liquid is then forced through a jet and impinged on the edge of the blade. This causes blade to vibrate at its natural frequency of about 22,000 cps. This ultrasonic energy acts to disperse the material. Gear pump, piping, and cylinder surrounding blade all are stainless steel.

Comcolloid has mounted ultrasonic disperser on a small table on wheels. This enables unit to be moved beneath processing vessels on above floor. A small vessel of about 10-gal capacity for experimental purposes is mounted directly on table.

Liquid to be dispersed is fed by gravity from any of vessels mentioned. For high mp liquids, disperser has to be preheated with low-pressure steam to avoid damage to gears in pump due to uneven expansion.

Results: Ultrasonic disperser has a capacity of 300 gph — six times that of previous mill while using less than half the horsepower. Unit dispersed several hundred thousand pounds of plant material during its first year of service. In addition, it is also used for experimental work. It has displaced two production mills and one lab mill.

Only maintenance on ultrasonic disperser has been $1.25 for a new blade. It has been shown by microscopic examination that the disperser gives an emulsion of more uniform particle size than did former equipment.

(Rapisonic disperser is product of Sonic Engineering Corporation, 146 Selleck St., Stamford, Conn.)

Check 1033 opposite last page.

Designed for flexibility and efficiency, Davison's nuclear fuel plant can turn out wide variety of reactor feed materials. Incorporating advanced know-how and latest production techniques, installation

. . . Purifies Uranium and Thorium

TED F. MEINHOLD, Associate Editor
with E. R. JOHNSON, Technical Director
and C. W. TAYLOR, Engineering and Production Director
Davison Chemical Co., Erwin, Tennessee

ONE of the most completely integrated plants built by private industry for making nuclear fuels is located at Erwin, Tenn. Owned by Davison Chemical Company, Division of W. R. Grace & Co., the facility started operations in Spring 1958 (see CHEMICAL PROCESSING, May 1958, pages 116-118).

Costing approximately $2 million, plant is equipped to provide the flexibility and variety of services needed to fit into an industry that is still in the research and development stage. The installation occupies an intermediate position between the basic producers of thorium and uranium raw materials and the ultimate users of nuclear fuels in reactors. Plant can turn out fuels in various forms, shapes, and sizes — including cast metal and ceramic elements as well as chemical solutions.

Boasts Pulse-type Extraction

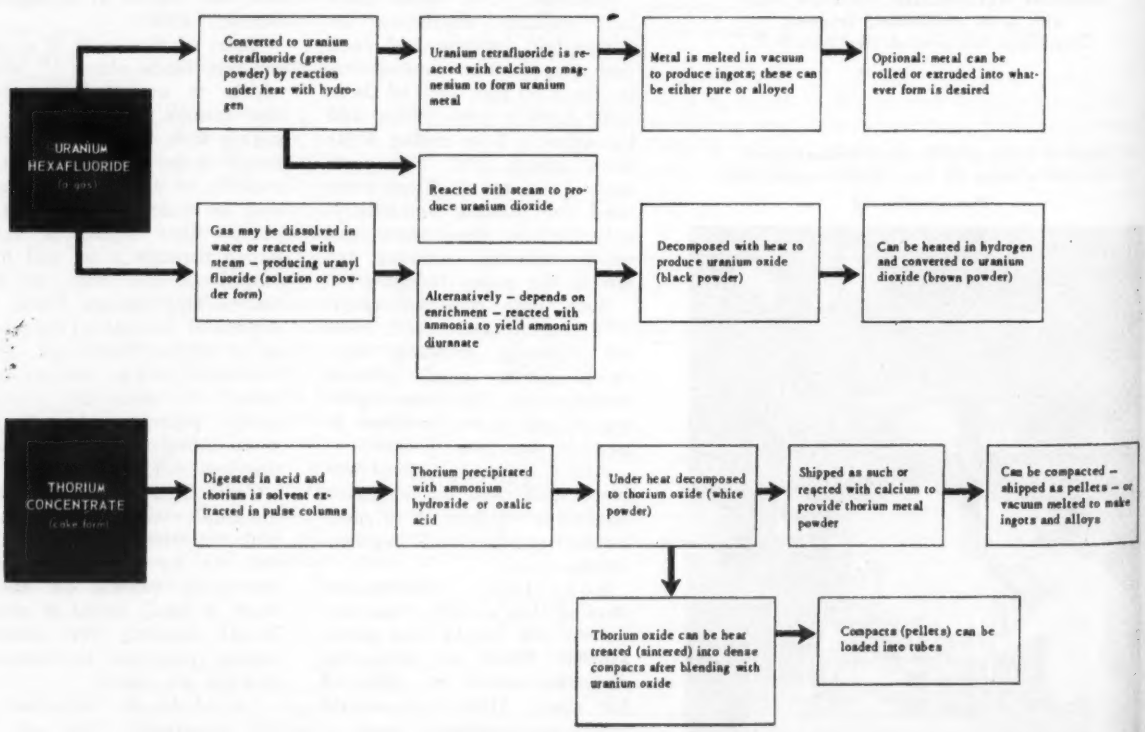
Big distinction claimed by the facility is that it is the only installation in private industry using pulse-type solvent extraction to purify uranium and thorium. Developed by AEC, the method permits quantity production of ultra-high purity end products.

The extraction equipment consists of 6"-diam and 8"-diam perforated-plate, 30' high columns. Plates in columns are spaced about 2" apart. Holes are ⅛", triangular-shaped, occupying approximately 23 percent of total plate surface. Both columns and plates are constructed of Type-304, ELC (extra-low carbon), stainless steel. Holes are so small that no liquid will flow through column unless some kind of pushing action — such as pulsation — is applied to column's contents.

Pumps Provide Pulse

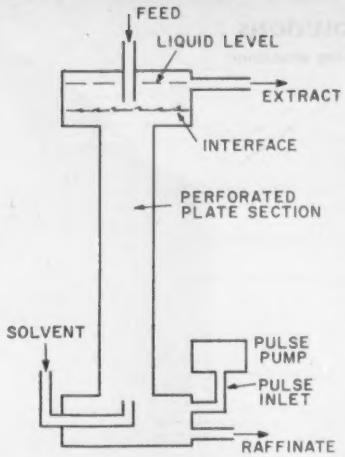
Key units in the operation are duplex, positive-displacement, controlled volume pumps supplying pulse to columns. Pumps provide pulse frequency ranging from 30 to 90 cycles/min. Pulse amplitude rates are ½ to 1½". Product flow rate is about 15-30 gph at 30 psi.

Pumps have flow accuracies within plus or minus 1 percent. Flow rates can be easily adjusted by changing plunger stroke length or pump speed. Units are adaptable to either manual or automatic control. Similar


URANIUM HEXAFLUORIDE (a gas)
Converted to uranium tetrafluoride (green powder) by reaction under heat with hydrogen
Uranium tetrafluoride is reacted with calcium or magnesium to form uranium metal
Metal is melted in vacuum to produce ingots; these can be either pure or alloyed
Optional: metal can be rolled or extruded into whatever form is desired
Reacted with steam to produce uranium dioxide
Gas may be dissolved in water or reacted with steam – producing uranyl fluoride (solution or powder form)
Alternatively – depends on enrichment – reacted with ammonia to yield ammonium diuranate
Decomposed with heat to produce uranium oxide (black powder)
Can be heated in hydrogen and converted to uranium dioxide (brown powder)
THORIUM CONCENTRATE (cake form)
Digested in acid and thorium is solvent extracted in pulse columns
Thorium precipitated with ammonium hydroxide or oxalic acid
Under heat decomposed to thorium oxide (white powder)
Shipped as such or reacted with calcium to provide thorium metal powder
Can be compacted – shipped as pellets – or vacuum melted to make ingots and alloys
Thorium oxide can be heat treated (sintered) into dense compacts after blending with uranium oxide
Compacts (pellets) can be loaded into tubes

Simplified flow diagram shows variety of operations performed at the plant

by Pulse-type Solvent Extraction



Schematic sketch shows main components and flow of material through pulse-type solvent extraction column. Drawing is taken from AEC report, TID-7534

pumps have proven to be excellent solution to many low capacity flow control problems encountered in continuous processing.

At Davison, nitric-acid digested, uranium ore concentrate is fed into top of first column. Uranium is extracted from the acidic feed into a solvent mixture of tributyl phosphate and kerosene. Flow through column is countercurrent, solvent entering at bottom of unit. All units are equipped with interface level controls in their phase disengaging sections.

Extract from first column is scrubbed with water or dilute nitric acid in second and third pulse columns. Resultant extract from these units is treated with deionized water in the last column. This unit has largest diam (8″). It re-extracts the uranium from solvent in form of a pure uranyl nitrate solution.

Extraction raffinate is monitored, neutralized, and discarded. Re-extracted solvent is recycled through system. Pure uranyl nitrate solution is sent to batch-type evaporator for concentration. Resultant concentrated solution is diverted to various production lines for processing into various types of nuclear fuels.

Advantages

Chief advantages claimed for pulsed columns over conventional packed solvent extraction columns are better efficiency, bigger throughput per given size, and less space requirements. Latter holds especially true when comparing heights of the columns.

Thorium concentrates may also be treated in the system. This is done in much the same way as uranium concentrates, but resulting in pure thorium nitrate solution. Recovery of uranium from enriched scrap materials is handled in similar manner.

The Davison plant, greatly simplified (for economic reasons) from similar plants operated by AEC, has a uranium hexafluoride throughput in excess of one million pounds per year. Primary feed materials to plant are: 1) uranium and thorium ore concentrates, 2) uranium hexafluoride (all U-235 enrichments), and 3) uranium-bearing scrap materials. In addition to nuclear fuel production, plant also offers analytical and testing services to the industry.

(Further information about nuclear fuel products may be obtained from Davison Chemical Company, Division of W. R. Grace & Co., P.O. Box 218, Erwin, Tennessee.)

Check 1034 opposite last page.

(Controlled volume pumps used in solvent extraction system were manufactured by Milton Roy Company, 1300 East Mermaid Lane, Philadelphia 18, Pennsylvania.)

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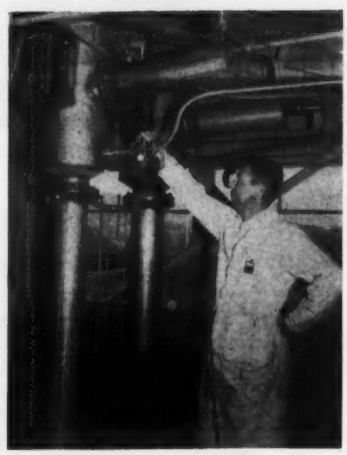
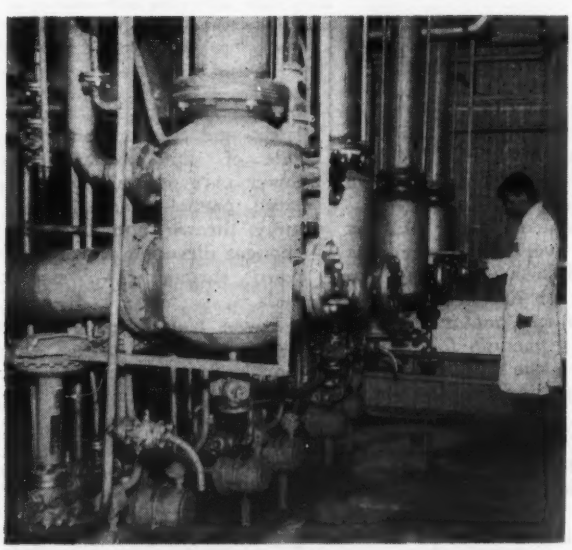
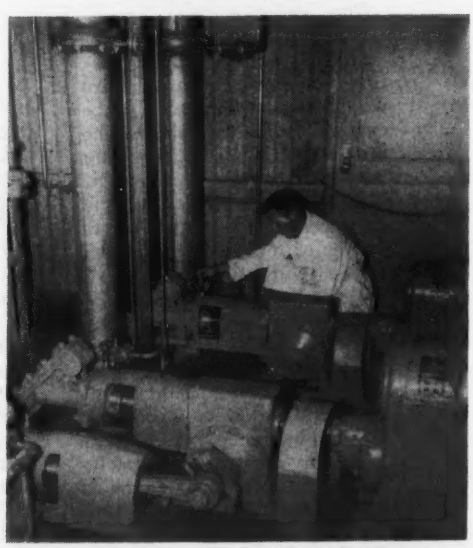


Adjusting reflux to one of the columns



Solvent extraction equipment consists of 30'-high, perforated-plate columns

Photos by CP Staff

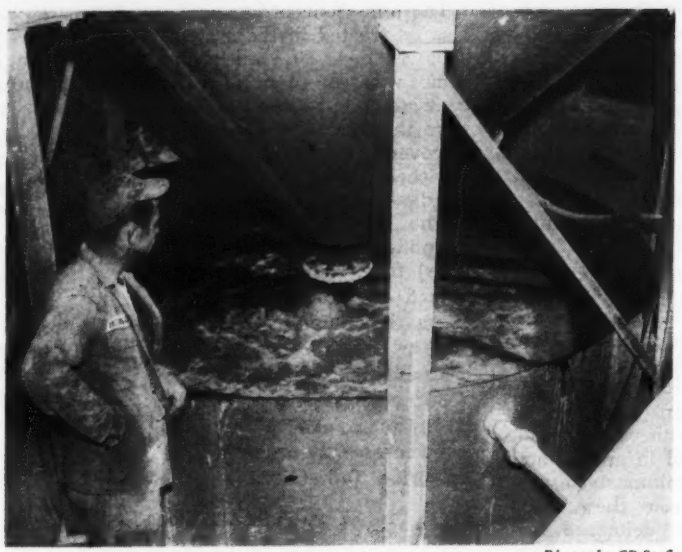


Duplex, positive-displacement, controlled volume pumps supply pulse to columns. Plant superintendent, Bob Moore, checks one of the units

Air pollution control is serious problem facing industry today. Fumes, dust, and odors can seriously strain plant's community relations. Faced with this problem, Indiana Farm Bureau co-op fertilizer installation found the answer in an efficient wet-type scrubber that . . .

Uses Marbles to Trap Dust at

TED F. MEINHOLD, Associate Editor
with **MYRON RUSHTON,** Plant Superintendent
Indiana Farm Bureau Cooperative Association, Inc.
Jeffersonville, Indiana



Photos by CP Staff

Dirty water containing both solubles and insolubles drains into tank beneath scrubber. Plant supervisor, Mike Bednarczyk, checks level

PROBLEM: Shortly after production of granular fertilizer started at the Jeffersonville, Indiana, plant of Indiana Farm Bureau Cooperative Association, Inc., plant officials were called on the telephone by neighbors complaining about dust and fumes emanating from the plant.

The situation was exceptionally bad on wet, foggy, or humid days, when high moisture content in atmosphere would cause pollutants to be carried from the plant. The dust problem inside the plant was also cause of concern.

The Jeffersonville plant produces over 10 different grades of mixed chemical fertilizer. Output runs close to 30,000 tons per year.

Solution: Based on successful results with similar equipment at their Indianapolis, Indiana, fertilizer plant, engineers installed an efficient, low-maintenance, wet-type scrubber. Device has capacity of 30,000 cfm and exhaust gases from plant's dryer, cooler, and ammoniator can all be handled by the system. Gas volumes and temperatures from these units run as follows: Dryer — 10,200 cfm at 240°F, cooler—12,500 at 180°F, ammoniator—6580 at 100°F.

Known as a Hydro-Filter, the scrubber consists of a mild steel, cone-bottom housing measuring 9'10" OD by 20'7⅝" over-all. A remotely mounted 30,000-cfm, 784-rpm exhaust fan driven by a 100-hp, 1800 rpm motor provides necessary vacuum for system. Cleaned gas is exhausted from plant through 100' stack. Interior of dust collector is coated with an epoxy coal-tar corrosion-resistant material known as Tarset.

Total cost of installation, including labor and all incidentals was $28,190.39. Equipment cost alone ran little over $12,000.

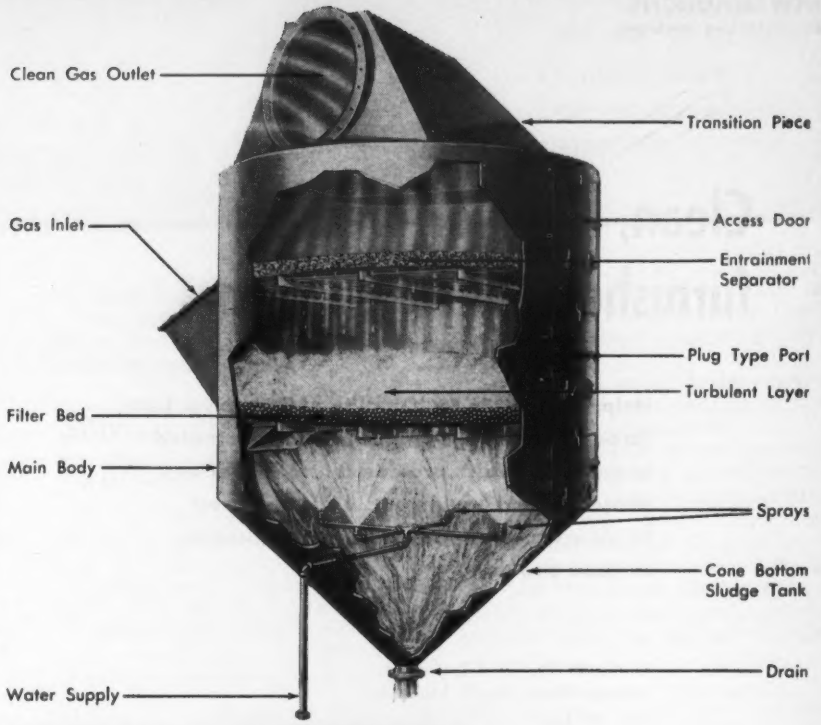
Dust removal is accomplished as follows. The dust-laden gas stream enters at side of unit, expands into lower part of housing where large particles are immediately thrown out. Gas then changes direction, flowing upward through two packed beds.

Lower bed (filter bed) has 3½" to 4" layer of ⅝" glass marbles resting on stainless steel ½" mesh. Upper bed (entrainment separator) consists of 1½" porcelain Berl saddles, 3½" to 4" depth, supported on stainless ½" mesh. Large-orifice, low-pressure spray nozzles impinge water onto bottom of filter bed and intermittently to top of entrainment separator. Sprays operate respectively at 20-25 lb and 5-7 lb. Surface of marbles is constantly wetted and washed at rate of about 120 gpm, using recirculated liquor. Water forms violent, turbulent layer, 4" to 8" thick, above marbles.

Flowing upward through marbles at velocity of approximately 4000-6000 fpm, gases are broken up into thousands of individual streams, each following its own upward course. Dust is removed by 1) impingement on wetted surface of glass marbles, 2) impingement on bubble surfaces and entrainment within falling water droplets, and 3) impingement on wetted surface of collection area.

Cleaned gas leaving filter

t 30,000-cfm Rate



Drawing shows how filter bed and entrainment separator are situated inside scrubber. Sprays in bottom of unit distribute 120 gal water per minute

bed passes through entrainment section where water droplets are removed. Pressure drop across filter bed is 5½" wg. Entrainment separator pressure drop is 0.4".

Dirty water containing both solubles and insolubles drains from cone bottom into 2500 gal tank located directly beneath dust collector. Water is recirculated back to filter bed to provide the 120 gpm needed there. About 10 gpm is sent back to ammoniator for controlling granulation. Water recirculation is accomplished by an all-iron, 3-hp, 130 gpm, centrifugal pump. Other than an occasional back-flushing of entrainment separator (to adjust analysis of particular grade of fertilizer and make up for losses from evaporation and bleed-off to ammoniator), there is no fresh water required after initial filling of sludge tank.

Results: The air pollution and community relations problems have been whipped. Dusty conditions inside plant have also been eliminated, greatly improving working conditions.

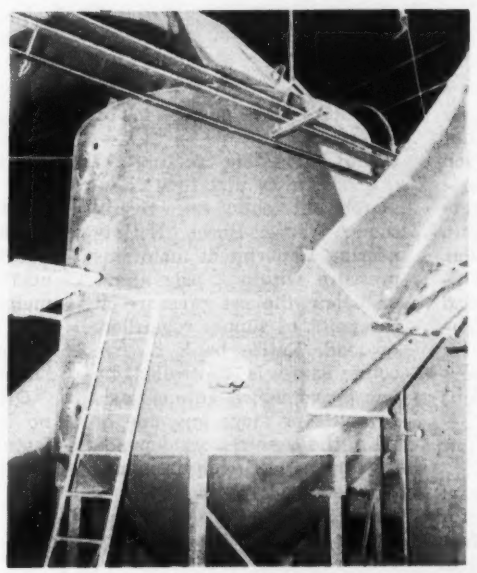
Over-all dust removing efficiency for the equipment is over 95% on dust loads averaging approximately 1 grain per standard cubic foot. A vapor plume is occasionally evident at the stack due to evaporation during scrubbing of hot gases, but this disappears rapidly, and for all practical purposes goes unnoticed.

Installed since March 1958, the dust collector has operated with only minimum maintenance. A 4" neoprene strip was installed around the filter bed where glass marbles come into contact with the epoxy coating. Friction caused coating to wear off after few months operation. Neoprene acts as bumper and has solved problem.

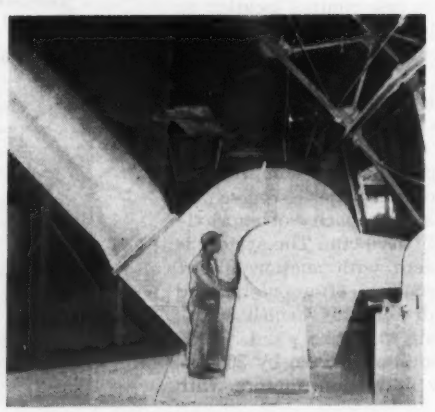
Sludge tank underneath scrubber has been cleaned only four times, one of which was merely to check on tank's interior condition. Except for routine lubrication, exhaust fan and water recirculating pump have not required any maintenance since installation over one year ago.

(Model-30 Hydro-Filter was manufactured by National Dust Collector Corporation, 549 West Washington Boulevard, Chicago 6, Illinois.)

Check 1036 opposite last page.



Dust collector consists of mild steel, cone-bottom housing measuring 9'10" OD by 20'7⅝" high



Remotely mounted 30,000-cfm exhaust fan provides necessary vacuum for system. Collector and portion of duct work can be seen in background

Clean, dry, oil-free air furnished by compressors

Help to maintain high quality of Budweiser beer through continuous operation of air-actuated instruments which provide control of various processes and equipment. Air is also used to blow water off tops of cans so packaging is clean and dry

R. W. SEIFERT, Chief Engineer
Anheuser-Busch, Inc., St. Louis, Mo.
with **CP Staff**

Operator checks meter reading on one of oil-free compressors in use at Anheuser-Busch

PROBLEM: At one time air for instruments and other services at Anheuser-Busch was supplied by 25 to 30 lubricated air compressors scattered throughout the plant. Because of this situation, quality of air varied considerably, as well as required pressure. Air-actuated instruments — a large number of which are used at Anheuser-Busch to control various processes and equipment — malfunction quite easily if air is oily and moist.

Solution: In recognition of importance of clean air for instruments, four oil-free compressors were installed in 1955 in one central location to supply air needs of entire plant. Fifth unit was added in 1958.

This central operation provides air at 90 psi from the five two-stage, motor-driven reciprocating compressors. These compressors have an aggregate capacity of approximately 5500 cfm. The system is complete with suction filters, intercoolers, aftercoolers, and dehydrators to furnish clean, dry air to entire plant. Compressors are driven by 200-hp, 2300v induction motors with capacitors for power factor correction.

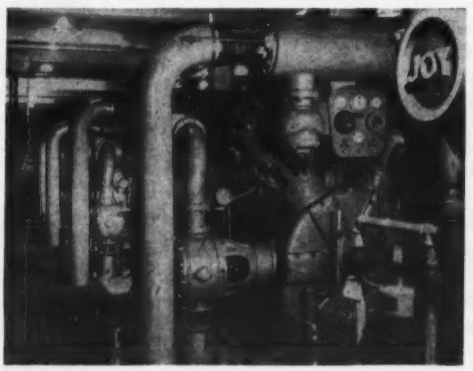
An interesting feature of this system is that it is completely automatic. As a result, the Anheuser-Busch Engineering Department maintains pressure within 2 psig above or below the set pressure at the point of supply regardless of load. Entire bank of five compressors is controlled by one board which automatically starts or stops any one or all of the compressors depending upon load requirements. Compressors are used 24 hours a day, but, of course, one compressor might not run for that entire period.

Each compressor has a meter which records number of hours run, enabling the Engineering Department to better maintain the equipment. Ring life for these oil-free compressors is approximately 8000 hours.

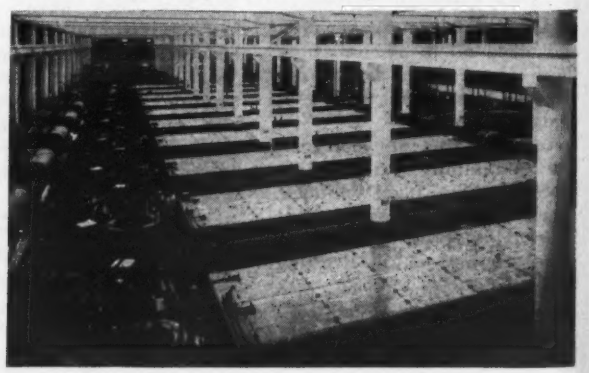
Oil-free compressors have no lubricants in cylinders, a feature made possible by the use of carbon-graphite piston rings. Compressors employ an extended rod, which means that no part of the piston rod that enters the crankcase passes into cylinder or stuffing box. An oil baffle ring on the piston rod further insures against oil creepage along the rod.

At the brewery in St. Louis, the air is first compressed. Then an intercooler removes part of moisture content between stages. After high pressure compression, air goes into an aftercooler which re-

"Instrument quality" air for entire plant is furnished by these five reciprocating compressors



Bottling plant of St. Louis brewery of Anheuser-Busch. Close temperature control of pasteurizers (right) is aided by clean air used by instruments. Air is also used to blow the water from the tops of cans of beer — keeping them clean and dry



duces both temperature and moisture content. From here, the air goes into a receiver, then into dessicant type dryers where more moisture is removed. Temperature of the air is reduced from 225 to 90°F in the summer and to 50°F in winter, which is within two degrees of aftercooler entering water temperature.

Results: Dry, oil-free air is helping to maintain air-actuated instruments in continuous operation. Since many of these instruments are used to control critical temperatures in pasteurization process, oil-free compressors contribute to the high quality of Budweiser and Michelob beer.

Use of this "instrument quality" air for entire plant is important in other operations. Air is used to blow water off tops of cans of beer as they emerge from the pasteurizers. It is important that this air be of high quality to keep packaging clean and dry. In addition, the oil-free air is used on instrumentation that maintains required storage cellar temperatures.

(WNOL 114E oil-free compressors are product of Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.)

Check 1037 opposite last page.

Purification ushers out mill condensate impurities

Problem: Wood fiber and black liquor, entrained in vapor from digester blow tank, caused condensate to be undesirably black and heat exchanger to become plugged, at a pulp mill of a southwestern paper plant.

Solution: Management decided to install purifier, designed to remove entrainment of pulp and liquid equivalent to 250 lb/hr. Unit operates in following manner:

As blow-off vapor enters purifier, two one-inch jets spray water into vapor to force heavier shives and impurities to sides of purifier vessel. Shives and impurities move gravitationally into hopper and are fed through chute

Progress Report...

— 1-Pentanol
— CELLOSOLVE acetate
— Emulsified buffing compounds

High-purity, straight-chain alcohol

A rose is a rose is a rose – except in some perfumes when the desired scent is contaminated by low-purity alcohols. To eliminate unwanted chemical odors in your perfumes, flavorings, and pharmaceuticals, you can formulate them with CARBIDE's high purity 1-pentanol.

1-Pentanol is now being produced by CARBIDE in two grades of purity – 90% and 98%. The former contains 90 to 95% straight-chain 1-pentanol; the latter, 98% or better. In each case the balance is branch chain primary amyl alcohol. 98% grade is the first commercially-available 1-pentanol of such high purity. Either grade gives fast, complete reactions and high production efficiency. There are no competing side reactions, no by-products, and no un-reacted residues. In addition, 1-pentanol is the most reactive of all primary amyl alcohols. CARBIDE's 1-pentanol is a water-white liquid with a boiling point of 138° C. It is the highest boiling of all the isomeric five-carbon alcohols. Derivatives are generally of comparatively low volatility. The solubility of 1-pentanol in water is 1.8% by weight at 20° C. These properties, both lower than those of branched or mixed amyl alcohols, are important in esters and other derivatives used as plasticizers, solvents, extractants, lubricants, and agricultural chemicals. As lubricants, such esters provide the low viscosity needed at extremely high altitudes.

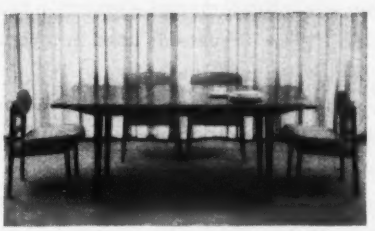
Resins produced from monomeric straight-chain derivatives of 1-pentanol are reportedly more crystalline than those made from isomeric derivatives. This has advantages in acrylates, methacrylates, silicones, and polyesters. Metal salts, phosphorous compounds, and other inorganic derivatives used as catalysts, additives, or inhibitors for fuels, oils, paints, and other materials may also gain advantages from these special amyl alcohols. 1-pentanol is also suggested for trial as an intermediate in the production of coupling agents for lubricants, alkyl nitrates as ignition promoters, ester plasticizers, and polyvalent metal amylates as epoxide curing agents.

For a technical bulletin listing properties, analyses, and suggested uses, check the coupon on this page.

Solvent saves time in furniture finishing

One of the most versatile of CARBIDE's lacquer solvents is CELLOSOLVE acetate. Because of its exceptional flow-out properties, it is widely used in formulating furniture and metal lacquers.

Lacquers containing CELLOSOLVE acetate require only minimal sanding or rubbing, helping to lower production costs.



Slow evaporation rate and improved flow-out ability make CELLOSOLVE acetate ideal for brushing lacquers, too. It provides good blush resistance and high gloss, whether used for conventional spraying, hot-spray finishing, "high-low" finishing, or brushing.

Further information on CARBIDE's esters is contained in the booklet, "Esters." Suggested applications include those for plastics, dyes, perfumes, and pharmaceuticals. Check the coupon for your copy.

Emulsified buffing compounds

Emulsion buffing compounds have several advantages over bar-type compounds for metal finishing. With CARBIDE's triethanolamine as the soap-forming emulsifier, compounds are quickly made ready for use and provide good flow properties. They are stable, less viscous on agitation, and hold the abrasive suspended even while stored. The emulsion is easily removed by rinsing.

Triethanolamine buffing emulsions have demonstrated savings of 25% in buffing time. The buff is evenly coated and gains one-third longer service life. Emulsion buffing compounds are economical, since only half the amount of the bar material is used, or less. The emulsion is non-flammable.

A CARBIDE Technical Representative can furnish you with information on formulation of buffing compounds with triethanolamine. Other information on ethanolamines is contained in a new booklet, "Alkanolamines and Derivatives." It includes a listing of properties, applications, and handling methods. Check the coupon for a copy.

Tear out this coupon. Check the boxes on which you'd like more information, and mail to Dept. H, Union Carbide Chemicals Company, 30 East 42nd Street, New York 17, N. Y.

☐ 1-Pentanol. ☐ Esters.
☐ Alkanolamines and Derivatives.

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And remember, there is a CARBIDE sales office near you where you can obtain the services of a CARBIDE Technical Representative. His wide industry experience is backed both by extensive chemical training and by Technical Specialists.

"Cellosolve" and "Union Carbide" are registered trademarks of Union Carbide Corporation.

UNION CARBIDE CHEMICALS COMPANY
DIVISION OF
UNION CARBIDE
CORPORATION

Check 1038 opposite last page

Textile Technology in Chemical Engineering

Fabric Construction and its effect on filtration

In spite of the emphasis placed on *fibers* and their specialized performance, the chemical and physical characteristics of a fiber are only part of the filter-fabric's story. *Construction* of the fabric (the weave, count, yarn twist, etc.) must be given thorough consideration in the final selection of a filter fabric or the establishment of filtration goals.

Weave, for instance, is a fundamental element in fabric construction. The various weaves are the result of different systems used in interlacing the lengthwise "warp" yarns with the crosswise "filling" yarns.

The *plain* weave has a simple "one up and one down" construction. By raising or lowering the "count" (number of warp and filling yarns per inch) this weave may be made as tight or as open as necessary.

The *twill* weave is recognized by the familiar diagonal "twill" line. Twills have fewer interlacings than the plain weave, and therefore offer greater porosity—but this, again, depends on the count.

The *satin* weave has even fewer interlacings, providing smooth surface, increased porosity and high cover factor (particularly important in gaseous filtration). Cotton fabrics in this weave are commonly known as "sateens."

These basic varieties—plain, twill and satin—have many variations. But whatever the weave, performance is seriously affected by count and other factors involved in fabric construction.

Which all adds up to this: for complete information about filter fabrics, don't go it alone. Go to the nearest specialist who distributes Wellington Sears filter fabrics. He'll help—so will our more than a century of experience in serving the fabric needs of industry. And for a handy booklet of information, write Dept. M-4.

Wellington Sears Company

FIRST In Fabrics For Industry

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Check 1039 opposite last page

to drainage pans by water from sparge ring.

Vapor enters into series of tangential slots in drying tuyere. Slots impart rotary motion that throws off scrubbing tray contaminants. Contaminants are forced against inner wall and move down into hopper.

Large particles of entrained material in incoming vapor blow past tuyere and move through bypass area to rear chamber of purifier vessel, falling into hopper. Vane blades on outlet tube prevent re-entrainment.

Unit weighs 8500 lb. It is designed to remove 99.5% or more of all entrained material, regardless of size (1 micron or

Purifier (center) installed between blow tank and water accumulator

smaller), with minimum pressure drop. Final carryover is held to as little as 1.0 ppm. Easy entry is provided by two 11 x 15" elliptical manholes.

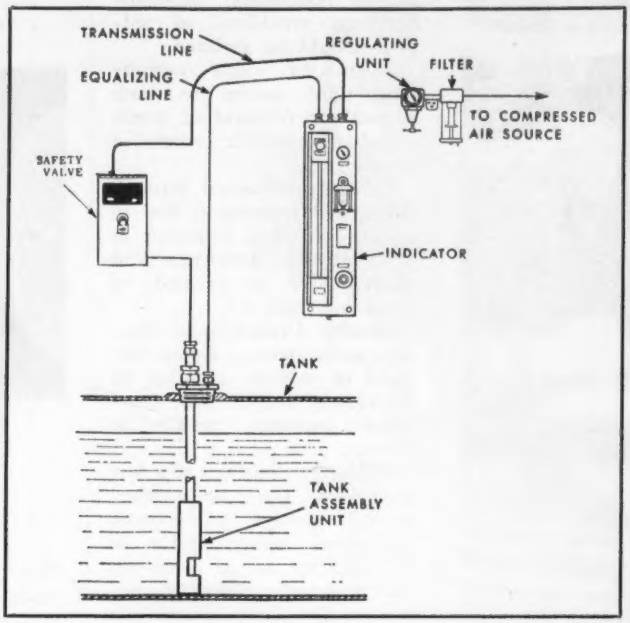
Results: Entire unit was installed during a holiday weekend. Only field assembly required was welding of hopper to purifier vessel, which was shipped as complete unit. Entire unit is self-supported and needed no supporting-structure expense.

Since purifier has been installed and operating, condensate is almost clear. Heat exchanger plugging has decreased by 80%. It is operating at flow of 160,000 lb of steam per hour at 1 psig with pressure drop of 1.23" water.

Because purifier has neither filters nor moving parts, no maintenance has been necessary in more than two years of operation.

(Centrifix CD purifier is a product of Centrifix Corporation, 3608 Payne Avenue, Cleveland 14, Ohio.)

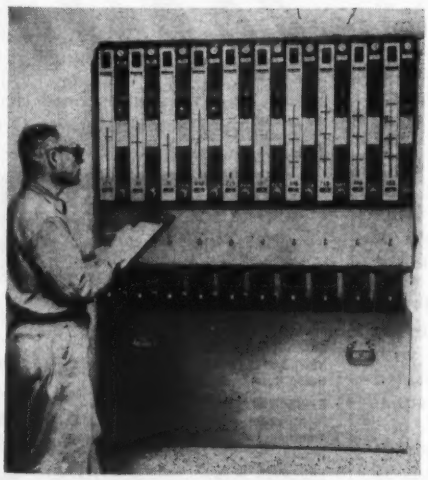
Check 1040 opposite last page.



Underground solvent storage with volume indicating system incorporates vapor-tight clean-out valves.

Storage in original drums wasted space and hampered inventory control at Gotham Ink & Color. New system . . .

Saves solvent-storage space, expedites reordering



Liquid-level indicators on panel are marked to correspond with economical reordering volumes

Problem: Storage of solvents in 55-gal drums required extensive storage facilities and handling at Gotham Ink & Color Company, Long Island City, N.Y. Maintenance of necessary inventory control was difficult under this system.

Company manufactures high-quality inks for gravure and flexographic printing processes. Variety of volatile ink solvents are used, including toluol, ethyl acetate, and petroleum spirits.

Solution: To alleviate storage problems, underground tank-storage system was installed. Each tank is equipped with remote-reading, hydrostatic, liquid-level gage and clean-out valve. All electrical equipment is of explosion-proof construction.

Gages provide accurate record of solvent on hand. They are marked in volume equivalents of one compartment of a tank truck.

By observing gages, superintendent

NEW
GACO V-80
HOT SPRAY VINYL

5 mils of high solids vinyl in a single spray coat and process equipment is protected against corrosive fumes and high humidity. GACO V-80 Vinyl films are hard but flexible, resist abrasion and most corrosive agents, and are easily cleaned. Hot spray technique allows deposit of a low plasticizer quick-drying film with little overspray and excellent edge buildup resistance to sagging. Write for details.

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THE MARK OF CORROSION PROTECTION

FOR HEAVY-DUTY CORROSION SERVICE
THE GACO CORROSION PROTECTION SYSTEM

Challenge: When paint or ordinary corrosion protection products won't do the job, specify GACO. A complete line: Neoprene, Natural Rubber, Vinyls, Liquids, Sheet, Putties . . . performance-proven in applications throughout the world. *And A Complete Service.* There's a GACO Corrosion Specialist in your area prepared to serve your needs. Write for further information—we'll forward case studies of interest.

THE MARK OF CORROSION PROTECTION
GATES ENGINEERING COMPANY
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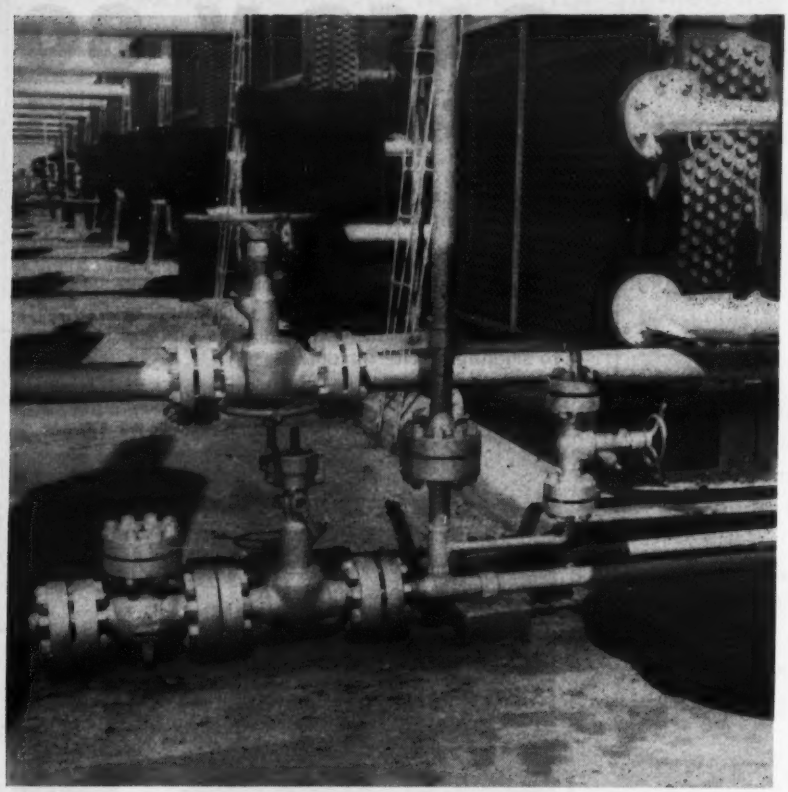
Check 1041 opposite last page

ORBIT VALVES

FORGED STEEL VALVES
FOR CHEMICAL & PETROCHEMICAL PLANTS



ORBIT VALVES shown here are installed on packaged gas booster.

Orbit valves were chosen for the above service because they require no lubricant to effect a shut-off, construction is vapor tight, there are no voids or cavities in body or bonnet where pressures can build up from trapped fluids when valve is either in an open or closed position. Stem packing chamber has great depth and capacity for easy adjustment. A pliable plastic type packing is utilized which can be added to or adjusted while the valve is in service and under pressure.

Please specify service intended when ordering Orbit valves. For other special applications, our industrial division will be glad to help you with your particular service problems.

Orbit valves have a long history of performance in: Rare gases of the atmosphere, nitrogen, oxygen, hydrogen, carbon dioxide, air and helium.

SIZES: 1", 1½", 2", 2½", 3" and 4" ASA 300-lb thru 2500-lb, full opening flanged and screwed ends. Venturi opening available in sizes: 2", 2½", 3", 4" and 6" ASA 150-lb thru 2500-lb flanged ends only.

SOURCE: Through your favorite industrial supply house.

LITERATURE: Write Department B for Catalog 58-B.

ORBIT VALVE COMPANY

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Check 1042 opposite last page

can determine whether or not an economical, six-compartment truckload of solvent should be ordered.

Clean-out valve permits vapor-tight access to tank bottom for removal of water or sludge and/or emptying of solvent.

Valve is connected through indicator transmission line to bottom of tank. Indicator is automatically disconnected when valve is opened to clean out tank.

Results: Underground storage saves space. Replenishment of solvent supplies by truckloads, rather than fractional amounts, results in savings.

Working conditions are less hazardous due to underground storage of solvent. Additional safety factor is provided by use of clean-out valves which eliminate necessity for open access to tanks.

(Petrometer industrial indicating system is development of Petrometer Corporation, 43-20 10th St., Long Island City 1, N. Y.)

Check 1043 opposite last page.

Mills share work load under the control of stream splitter

Expansion of grinding needs met by parallel-mill system

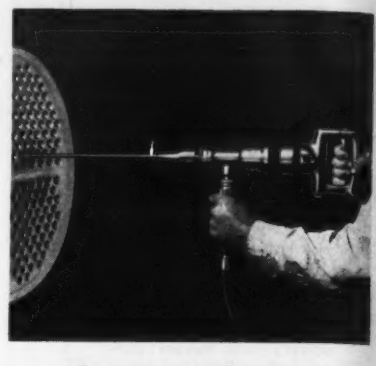
Problem: Expansion at American Distilling Company, Pekin, Ill., had overtaken capacity of double-runner attrition mill which was grinding corn, milo, rye, barley, malt, and other ingredients.

The mill received from grain-storage bins and discharged into mechanical handling system consisting of screw conveyor and bucket elevator.

Solution: Another mill was added in parallel to existing machine. Stream splitter with two outlets was incorporated into system to provide equal flow to both mills.

Four whole-grain storage bins discharge to common 12 x 18" screw conveyor. Center outlet of conveyor allows

AIRETOOL CLEANER

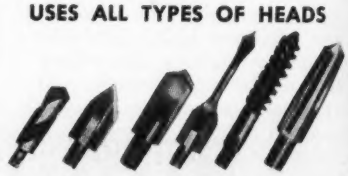


cleans condenser, H. E. tubes fast

This new, advanced design Airetool Model CC-475 Cleaner does a fast, thorough job of cleaning heat exchanger and condenser tubes. Built-in flushing system washes out debris, stops jamming. The result is faster, more complete cleaning. And the flushing agent keeps the cleaning head cool, which extends head life.

You get all these advantages, yet this sturdy, pneumatic tool weighs only 10 pounds. One man operates it easily without need for supporting rig. For full details, or plant demonstration, write today.

USES ALL TYPES OF HEADS



Every type of cleaning head can be used with Airetool Model CC-475. And Airetool makes them all.

BRANCH OFFICES:
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REPRESENTATIVES
in principal cities of U.S.A., Canada, Mexico, South America, England, Europe, Puerto Rico, Italy, Japan, Hawaii.

EUROPEAN PLANT: Vlaardingen, The Netherlands

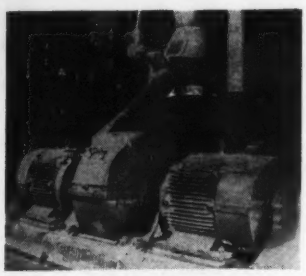
CANADIAN PLANT: Brantford, Ontario

Check 1044 opposite last page

grain to pass over magnetic separator on way to stream splitter.

Grain enters top of stream splitter where it strikes impeller. Material is agitated by impeller into continuous cloud which settles into outlets to provide an accurate division of flow.

Leather brushes on lower end of drive shaft sweep all grain into outlets. Capacity adjustment is made by raising or lowering impeller. Dust-



Stream splitter divides grain flow evenly between two attrition mills

proof, clear-plastic observation windows permit constant checking of operation.

As ground grain emerges from attrition mills, it is conveyed to roof of building by 50-hp, 44" negative-pressure system to a ground-grain storage bin.

Stream splitter has heavy-gage steel housing with flanged top inlet and outlets. Up to eight outlets may be included.

One-piece, stainless-steel impeller, rotating at 300 rpm, and leather-brush assembly are mounted on drive shaft inside housing. Shaft revolves in sealed, anti-friction bearings. Unit is powered through V-belt drive from 1/3-hp motor mounted on adjustable bracket attached to housing.

Results: Stream splitter divides flow equally between two attrition mills. Both units are kept uniformly fed throughout processing cycle. From 12,000 to 15,000 bu/day are handled.

(Richmond stream splitter is product of Sprout, Waldron & Company, Incorporated, Muncy, Pennsylvania.)

Check 1045 opposite last page.

Pays for itself in Savings!

Lapp PULSAFEEDER

CONTROLLED-VOLUME CHEMICAL PUMP

The moment your new Pulsafeeder is put into operation, you're on the way to real savings . . . savings that can eventually result in the Pulsafeeder paying for itself.

Lapp Pulsafeeder, the chemical pump with *no stuffing box*, is a piston-diaphragm pump providing *positive displacement* by a piston pumping a hydraulic medium working against a diaphragm. The diaphragm isolates the chemical being pumped from the working pump parts . . . eliminates need of stuffing box or running seal . . . prevents corrosion. Maintenance costs are reduced to next to nothing—there are practically no repairs or replacement of parts with a Pulsafeeder. You'll save, too, by elimination of product loss due to leakage or contamination. In the long run, Pulsafeeder is the safest, surest and lowest cost controlled-volume chemical pump. To prove our stand, we'll be happy to quote actual maintenance costs taken from recorded case histories.

NO LEAKAGE
NO CONTAMINATION
NO PRIME LOSS
NO STUFFING BOX

Lapp

WRITE FOR BULLETIN 440 with typical applications, flow charts, description and specification of models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Div., 9507 Poplar St., Le Roy, N. Y.

Check 1046 opposite last page

Torque-Arm

THE DODGE DEVELOPMENT THAT CHANGED THE NATION'S HABITS OF SPEED REDUCTION

America's Most Complete Line of Shaft Mounted Speed Reducers

55 MODELS

- 1 to 200 hp. at 100 rpm!
- Output speeds from 10 to 378 rpm!
- Single Reduction
- Double Reduction
- 5 to 1 Ratio
- 15 to 1 Ratio
- 25 to 1 Ratio
- Any speed ratio up to 150 to 1 obtainable by selection of pre-determined combination of reducer and V-belt drive.

CALL THE TRANSMISSIONEER—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

In fewer than ten years, the range of Torque-Arm Shaft Mounted Speed Reducers has increased from 6 to 55 models, to meet the ever increasing demand for this improved method of speed reduction.

By eliminating foundation, sliding base and flexible coupling this modern speed reducer has saved untold installation time and untold dollars of cost.

The rugged semisteel housing developed by Dodge has never been improved upon. It is corrosion resistant—and it has the strength to hold bearing seats in line for the life of the unit.

Dodge design provides wide spacing for the bearings. Loads are carried easily, contributing to Torque-Arm's long life and very high efficiency. The gears are finest quality—helical, heat treated steel.

Torque-Arm mounts vertically or horizontally in any position around the driven shaft. It locks to the shaft on *both* sides of the housing. The holes in the output hub provide simple removal with puller. Overload release and built-in backstop are optional.

Dodge Torque-Arm is America's most widely used shaft mounted speed reducer. It is stocked by your local Dodge Distributor. Ask him. Or write us for bulletin.

DODGE MANUFACTURING CORPORATION, 6200 Union, Mishawaka, Ind.

DODGE
of Mishawaka, Ind.

Check 1047 opposite last page

NEW SOLUTIONS

Gas-tank evaporation reduced by 85%

Testing of plastic vapor seal at Esso's Flamington, N. J., plant indicated that use of the seal can reduce evaporation losses 85%.

Vapor seal has inflatable flotation ring around circumference, thus maintaining sufficient buoyancy, with approximately two psi, to support sealing membrane above surface of volatile product.

Plastic vapor seal has inflatable flotation ring around circumference

Measuring well in plastic membrane permits lowering of gage tape and bob and thermometer. Vertical anchor cable prevents flotation. Half wipers around periphery of flotation ring maintain tight seal against tank wall as level of fluid is raised or lowered.

(Plastic vapor seal is product of Plastic Creators, Inc., 16 Industrial Ave., Little Ferry, New Jersey.)

Check 1048 opposite last page.

WANTED: NOMOGRAPHS — WORTH $20 EACH!

Do you have a pet nomograph that could save time for other CHEMICAL PROCESSING readers? If so, send it neatly and accurately drawn, with a double spaced, typewritten description to:

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CHEMICAL PROCESSING
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Chicago 11, Illinois

We will pay $20 for each one accepted and published.

OCESS PIPING POINTERS

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high-pressure processing

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so available, gate
ttern with Stel-
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th angle and gate
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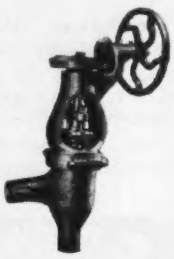

w lightweight 18-8 valves
r cryogenic services

Extremely
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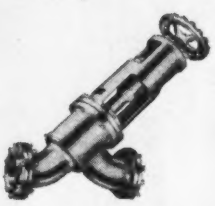


4-in. gate gives unusual
rvice on 850 deg. F. gas

This solid wedge disc steel gate valve installed 17 years ago on 850 deg. F. gas service in a solvents plant, still remains leak-free and maintenance-free. The combination of good body castings and Exelloy seating gets full credit. Read the facts in Crane ad on next page.

For literature or data on products listed above, please contact J. E. Bradbury, Manager, Chemical Sales Dept. No obligation.

CRANE CO.

Gen'l Offices: 836 S. Michigan Ave., Chicago 5
VALVES • FITTINGS • PIPE
PLUMBING • HEATING • AIR CONDITIONING
Branches and Wholesalers Everywhere

Check 1049 opposite last page

CUT HERE AND FILE

Nomograph for Mixing Solutions

R. J. LAMBERT
Minnesota Mining & Mfg. Co.
St. Paul, Minn.

The accompanying nomograph will help one to determine quickly the wet weight of a solution to be added to another when the wet weight to be added is dependent upon a definite solids ratio.

In the case of chart shown here, the solids ratio is equal to 1.00. If a different solids ratio is desired, scales B and D should be shifted. For example, if solids ratio of 0.6 is desired, scales would be shifted so that 1667 lb on scale B and 166.7 lb on scale D fall on the index line (top).

In this manner a nomograph is simply constructed to determine the wet weight of a solution to be added to another for any solids ratio.

Typical Example

Given the following factors:

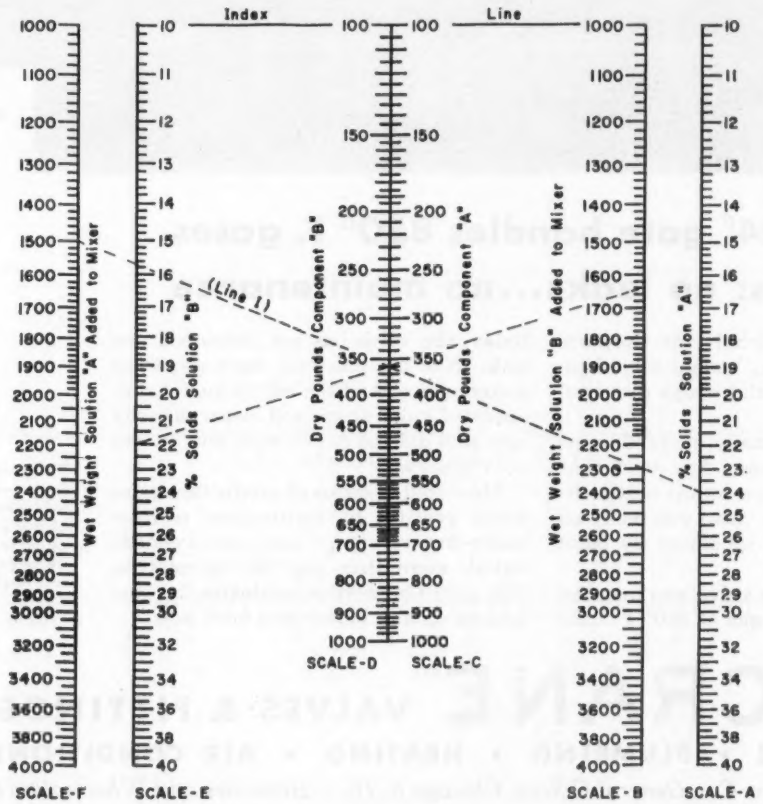
Solids of solution A = 24.0%
Wet weight solution A added to mixer = 1500 lb
Solids of solution B = 22.0%

find the wet weight of solution B to be added to solution A to give solids ratio (A/B) of 1.00.

Draw line connecting 24% on scale A with 1500 lb on scale F (Line 1). Now draw a line connecting 22% on scale E with intersection of Line 1 on scales C and D and extend line to intersect scale B.

This point of intersection on scale B gives wet weight of solution B to be added = 1640 lb.

Scales C and D can be used to give the total or individual dry solids weight for each solution. In the above example this is 720 lb dry solids for the finished solution or 360 lb dry solids for each of the component solutions.



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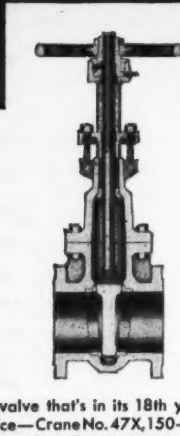
17 years' service vindicates engineers' choice of valve



The valve that's in its 18th year of service—Crane No. 47X, 150-pound, solid wedge disc steel gate. Available in 2 to 24 in. Other types for oil, oil vapor, steam, or water service for pressures up to 2500 pounds (and higher) and temperatures up to 1100° F. Your inquiry solicited. Write to address below.

Crane 24″ gate handles 850° F. gases 17 years: no leaks...no maintenance

In 1942 Commercial Solvents Corporation, Sterlington, La., bought a hard-to-get Crane 24-inch, solid wedge disc steel gate valve.

At that time virtually all production was for national defense. Any down time for valve maintenance meant costly delays. So, this Crane valve was really on the spot—to justify its choice by plant engineers.

From the day the valve was installed to handle synthesis gas at 850° F. until today, the valve has not developed one leak. Nor has one cent been spent for maintenance. And the big 24-inch, hand-operated valve opens and closes as easily now as it did the day it went into service—17 years ago!

Measured in terms of production gains made possible by continuous, maintenance-free service, Crane quality-made valves more than pay for themselves. Ask your Crane Representative for quotations on any valves you need now.

CRANE® VALVES & FITTINGS

PIPE • PLUMBING • HEATING • AIR CONDITIONING

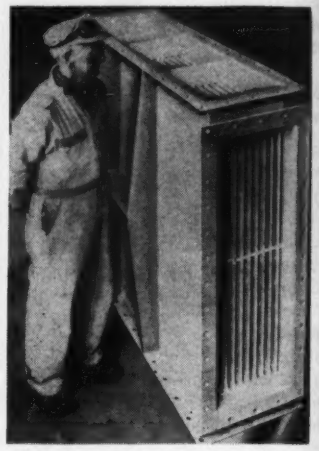
Since 1855—Crane Co., General Offices: Chicago 5, Ill.—Branches and Wholesalers Serving All Areas

Check 1050 opposite last page

Drying with indirect heat maintains needed purity of alloy powder

Extra purity-processing step is eliminated

Problem: Variations in quality of ferro-alloy powders, caused in drying by contact with hot gases of combustion from oil-fired burner, necessitated further processing of powders to attain desired quality control at Exton, Pa., plant of Foote Mineral Company. Powders are used as welding-rod coatings.



Extended-surface, plate-type heat exchanger operates on cross-flow principle

A complicating factor, in implementing a proposed conversion to indirect heating of the powders, was space limitation imposed by ducting and layout considerations.

For this installation, heat exchanger had to be capable of handling up to 7000 lb/hr of each fluid, resulting in pressure drop of less than three inches WG and transferring up to one million Btu/hr.

Solution: Extended-surface, plate-type heat regenerator was installed. It is approximately 14″ wide, 48″ long, and 48″ wide between inlet and outlet ducts. Unit contains 1810 sq ft of heating surface. It will operate under temperatures up to 950°F.

Burner equipment and heat

To page 46

DUCON
DYNAMIC WASHERS

RECOVER DIFFICULT DUSTS EFFICIENTLY AND ECONOMICALLY

Ducon UW-4 Dynamic Wet Dust Collectors have added a new dimension in dust recovery. They have replaced, with outstanding success, many more costly and less effective dust collectors in the recovery of "difficult" materials, such as fine and abrasive dusts in kilns, rotary driers and other applications.

The UW-4 Washers are also ideal for high loading conditions where maximum efficiency is desired.

Ducon UW-4 Washers offer other unique advantages, including constant air capacity, low water consumption and rugged construction. They are self-cleaning and fire and explosion proof.

Send for Bulletin W-7456.

the name in DUst CONtrol

THE **Ducon** COMPANY, Inc.
147 EAST SECOND STREET • MINEOLA, L. I., NEW YORK

Check 1051 opposite last page

APRIL 1959

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processing and engineering **data**

Heat Required for Melting Glass

D. S. DAVIS
Head, Dept. of Pulp and Paper Technology
University of Alabama

This nomograph enables rapid and accurate solution of the Hartford-Empire standard practice formula[1] for melting glass in regenerative furnaces:

$$H = 0.6A + 4.8G + 50$$

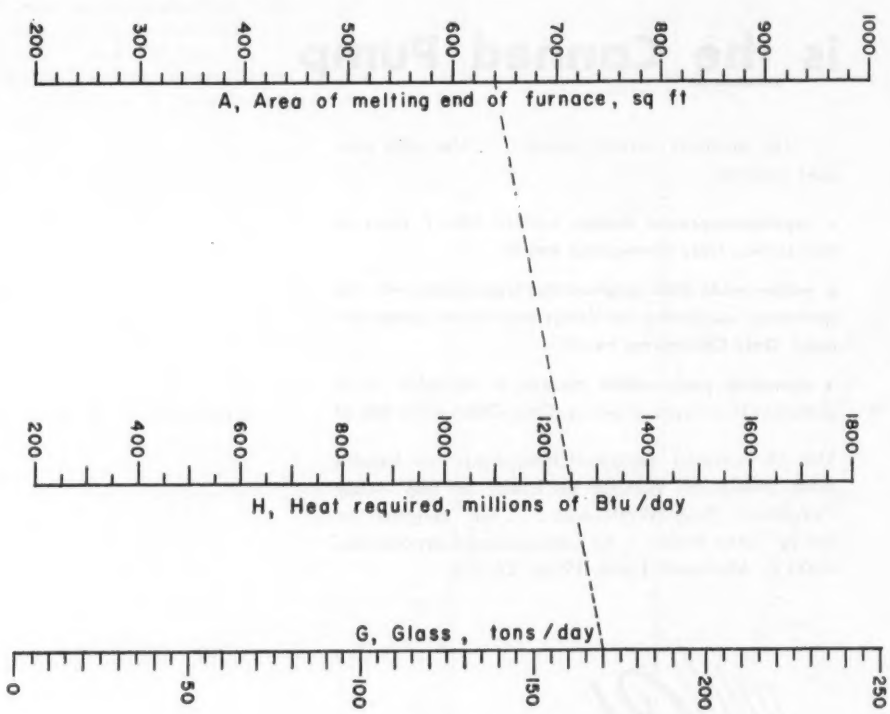
where

H = heat required, millions of Btu/day
A = area of melting end of furnace, sq ft
G = glass melted, tons/day

The broken line on the chart, which was constructed by well-known means[2], shows that 1250 million Btu are required to melt 170 tons of glass per day when the area of the melting end of the regenerative furnace is 640 sq ft.

LITERATURE CITED

1) CREASY, M. S., and LYLE, *A. K., Ceramic Industry*, 67 (3) 99 (1956).
2) DAVIS, D. S., "Nomography and Empirical Equations," Chap 5, Reinhold Publishing Corp., New York, 1955.



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The BEST PUMP

for costly fluids is the Canned Pump

Pump and motor are a single, leakproof unit . . . with no seals or stuffing boxes. Costly fluids stay inside where they belong.

CHEMPUMP

is the Canned Pump

. . . the original canned pump . . . the only one that assures:

- **experience-proved design,** evolved from 7 years of field service. **Only Chempump has it!**
- **nation wide field engineering** organization with the specialized application knowledge that canned pumps demand. **Only Chempump has it!**
- **operating performance records** in thousands of installations in all types of service. **Only Chempump has it!**

Use *the* canned pump—Chempump—to handle your costly or volatile or toxic, or any other "problem" fluid. *Write now* . . . for "request for quote" data sheet . . . to Chempump Corporation, 1300 E. Mermaid Lane, Phila. 18, Pa.

Chempump

First in the field... *process proved*

Check 1052 opposite last page

From page 44

exchanger are closely coupled with approximately five feet of ducting. Combustion gases move vertically through exchanger and out a stack.

Air is drawn from outside and increases in temperature as it moves horizontally over heating elements in exchanger. High-temperature air is carried approximately 25′ to vertical dryer next to a 10 x 22″ insulated duct.

Results: Desired quality control of ferro-alloy powders is now maintained without further processing after drying.

(Fin-Pak heat exchanger is product of The Air Preheater Corporation, 60 E. 42nd St., New York 17, N. Y.)

Check 1053 opposite last page.

Silicone bag coating solves nitrile rubber unpackaging problem

Peeling paper and soapstone dusting now eliminated

Problem: Removing nitrile rubber from multiwall bags after long-distance shipping and storage in warm warehouses was troublesome because sticky nature of product made it difficult to peel paper away from rubber.

To minimize unpackaging problems, inner ply of bag was treated with clay coating. Rubber, manufactured by B. F. Goodrich Chemical Company at Cleveland, Ohio, was dusted with soapstone prior to bagging.

Then, to eliminate stickiness, bag walls were treated with a silicone compound. This solved the stickiness problem, but another arose when it was determined that the particular silicone applied was migrating into the rubber.

Solution: A chemical company teamed with manufacturer of the multiwall bags to develop an effective release coating that does not migrate or transfer. A water-dilutable (40% solids) silicone emulsion (called Syl-off 22), this

To page 48

STICKY BINS

are no problem with a

CLEVELAND VIBRATOR

A Cleveland Vibrator keeps bulk chemicals flowing freely from any type of bin. Constant shaking breaks up arches and jams before they start. You save time, and your bins are not damaged by hammering.

AIR

ELECTRIC

Cleveland Vibrators are low in initial cost and inexpensive to operate. Cleveland manufactures both air and electrically operated vibrators. Either type will do the job; pick the one that fits best in your plant.

Write today for complete literature and prices.

Dept. 3C1,2706 Clinton Ave.
Cleveland 13, Ohio

Check 1054 opposite last page

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Pound-molecular volume of gases

GERALD TEPLITZKY
American Cyanamid Company
Bound Brook, N.J.

These two nomographs enable one to calculate the pound-molecular volume of ideal gases in cu ft when the temperature in °C and the pressure in mm Hg are known.

The index line in Figure 1 shows that the pound-molecular volume of an ideal gas is approximately 23,000 cu ft when the temperature is 300°C and the pressure is 25 mm.

The index line in Figure 2 shows that the pound-molecular volume of an ideal gas is approximately 2500 cu ft at 250°C and 210 mm.

Figure 1 covers range from 20 to 150 mm. Figure 2 goes from 150 to 760 mm.

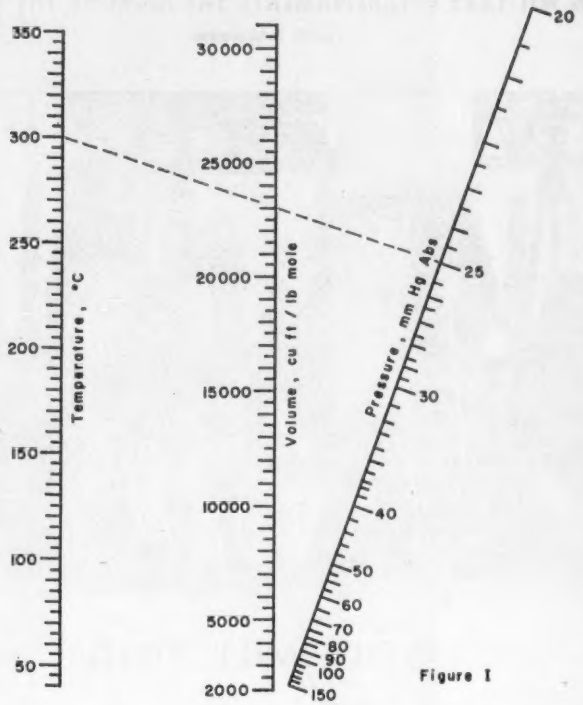

Figure 1

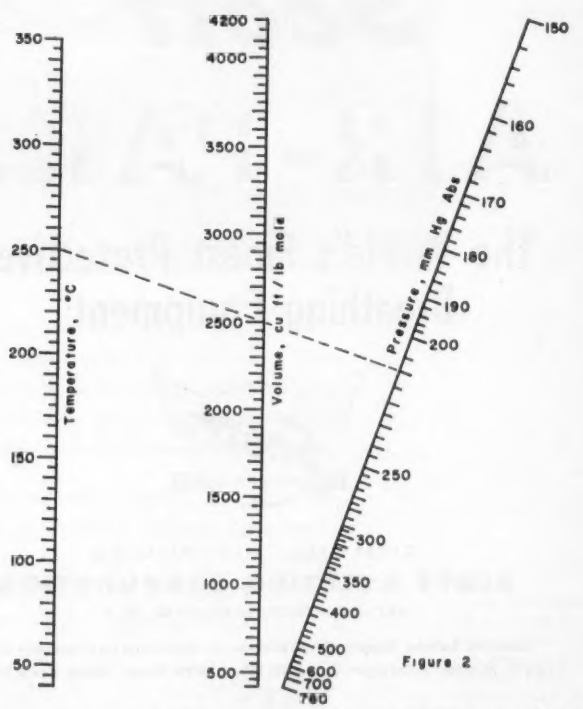

Figure 2

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WHEREVER **BIG** THINGS
ARE BEING DONE

IN MILITARY ESTABLISHMENTS THROUGHOUT THE WORLD
(AND ELSEWHERE)

YOU WILL FIND

Scott

AIR-PAKS

The World's Finest Protective Breathing Equipment

SINCE 1932 Scott FOR SAFETY—FOR SERVICE

SAFETY EQUIPMENT DIVISION
SCOTT AVIATION CORPORATION
242 ERIE STREET, LANCASTER, N. Y.

Canada: Safety Supply Co., Toronto — Branches in Principal Cities
Export: Southern Oxygen Co., 250 West 57th Street, New York 19, N. Y.

SCOTT ALSO MANUFACTURES HIGH ALTITUDE OXYGEN EQUIPMENT FOR MILITARY EMERGENCY ESCAPE SYSTEMS AND OXYGEN EQUIPMENT FOR CIVIL AVIATION INCLUDING THE WORLD'S LEADING AIRLINES

Check 1055 opposite last page

NEW SOLUTIONS

From page 46

anti-adhesive silicone coating can be applied to one side or both sides of paper. It provides a permanent coating that does not contaminate products packaged or stored in container.

Coating the multiwall bag liners does not change appearance or handling properties of stock. A notable degree of water repellency is imparted.

Results: Peeling paper from rubber has been eliminated. Customer merely has to shuck rubber out of bag. Soapstone dusting prior to packaging has been done away with if packaging is done when rubber is not too warm.

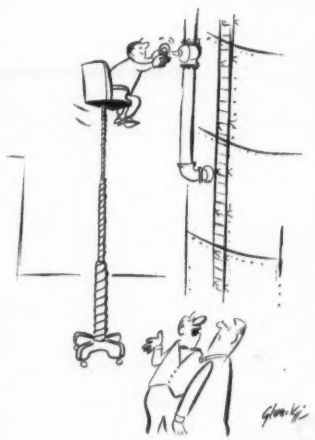
Response of customers has been highly favorable. Elimination of dusting has resulted in better plant appearance for them as well as for rubber manufacturer.

(Syl-off 22 is product of Dow Corning Corporation, Midland, Michigan.)

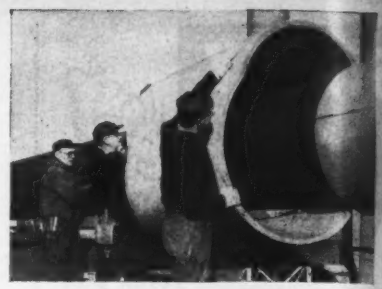
Check 1056 opposite last page.

(Multiwall bags were manufactured by Raymond Bag Corporation, Division of Albemarle Paper Manufacturing Company, Middletown, Ohio.)

Check 1057 opposite last page.



"Lazy? I think he's ingenious."



G-B SNAP*ON DISTRIBUTORS
(See ad on facing page)

AKRON, Ohio, The Asbestos Supply Co.
ALBANY, Ga., Industry Insulation Co.
ALBUQUERQUE, Mt. States Insulation Co.
AMARILLO, McDonald Engineering & Insulating Co.
ATLANTA, Ga., Reynolds Aluminum Supply Co.
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CHICAGO, Culberg Asbestos & Cork Co.
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CHILLICOTHE, Ohio, Southern Ohio Insulating Co.
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COLUMBUS, Culberg of Ohio
Santeler Brothers
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GREENSBORO, N. C., Starr Davis Co., Inc.
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Reynolds Aluminum Supply Co.
JOPLIN, Mo., Joplin Cement Co.
KANSAS CITY, Central Supply Co.
LITTLE ROCK, Gunn Distributing Co.
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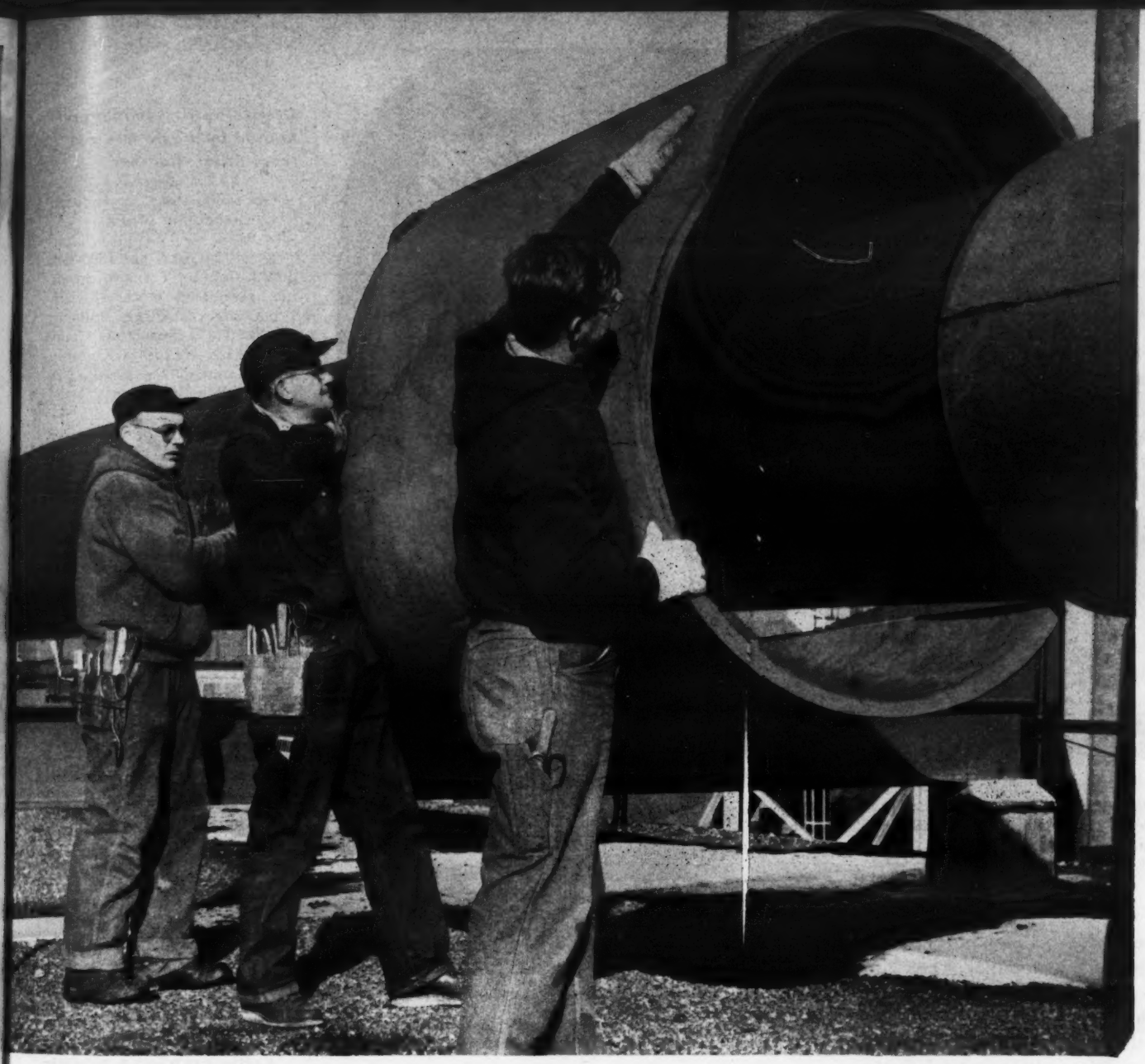
GUSTIN gb BACON



They compared "K" factors and cost factors . . . and bought SNAP*ON®

FOR FREE TEVA SURVEY CALL YOUR LOCAL G-B SNAP*ON DISTRIBUTOR LISTED IN ADJOINING COLUMN

For big pipe applications, they found nothing that can actually *be* compared with Snap*On, the original one-piece pipe insulation molded of fine glass fibers. *Only* Snap*On is offered in one-piece sections, plain or jacketed, in diameters up to 36" — and these huge sections snap over pipe in less time than it takes to tell. Application couldn't be easier or more economical.

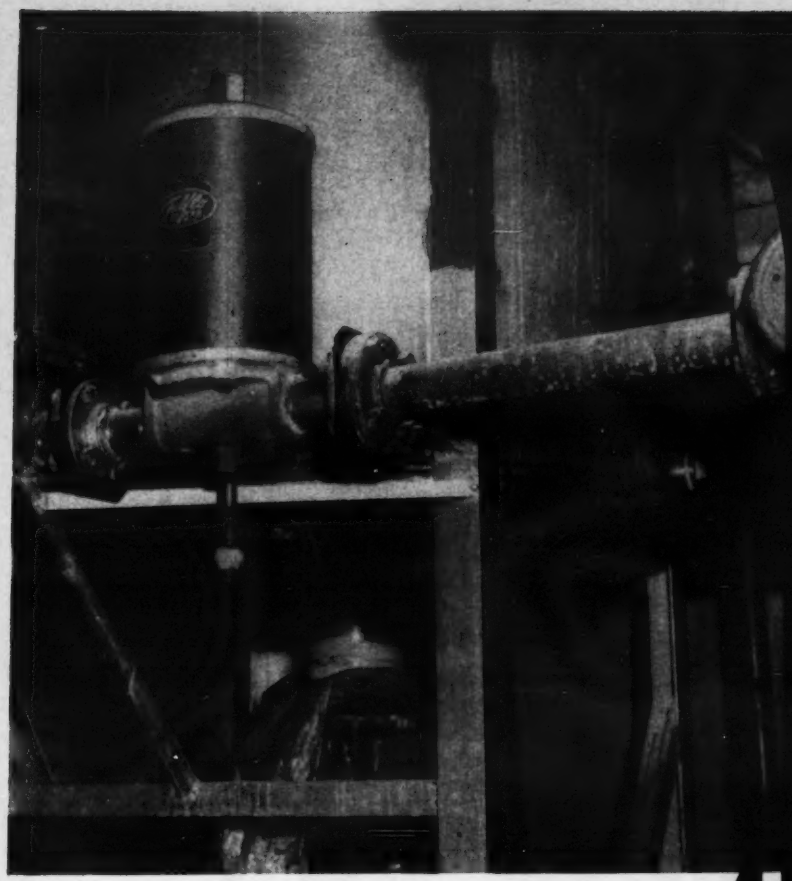
Consider, too, that Snap*On is permanent, yet reusable, and that its thermal efficiency rates with the highest of any general purpose pipe insulation on the market. Better yet, actually compare Snap*On the next time you insulate by asking your G-B Snap*On distributor to make a TEVA (Thermo-Economic Value Analysis) survey of your requirements.

GUSTIN-BACON *Manufacturing Co* GUSTIN gb BACON

254 W. 10th St., Kansas City, Mo.

Thermal and acoustical glass fiber insulations • Pipe couplings and fittings
Molded glass fiber pipe insulation

For more information on product at left, specify 1058 see information request blank opposite last page.



Fulflo filters help assure high purity of NRC Tantalum

WY Fulflo Filter, installed between solution make-up tank and processing tank manifold, removes micro-contaminants from chemical solutions in manufacture of NRC Tantalum.

National Research Corporation of Cambridge, Mass., are specialists in high purity. Their latest achievement — NRC Tantalum — is a triumph of high purity, high corrosion resistance and high melting point that provides new standards of quality for electronics, melting and fabrication.

In the production of high-purity Tantalum, it's only natural that NRC turned to another specialist in high purity — Commercial Filters Corporation. In the specific operation illustrated, Fulflo Filters remove solid contaminants as small as 6 microns in size from sulfuric acid and other solutions used in the production of Tantalum. Stainless steel containers and Dynel Honeycomb Filter Tubes resist acid solutions. Long-lasting tubes require no maintenance between changes.

Fulflo Filters provide any degree of micro-clarity (down to 1 micron) for all types of petrochemicals, liquid chemicals, pharmaceuticals, oils, liquid fuels, water, compressed air and other gases. They are available in a wide range of models for high or low flow rate, pressure, viscosity, *p*H or temperature.

Write for technical literature or engineering assistance to Department CP.

COMMERCIAL FILTERS CORPORATION
MELROSE 76, MASSACHUSETTS
PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

MICRO-CLARITY AT MINIMUM COST

Fulflo FILTERS — *with genuine Honeycomb Filter Tubes for controlled micro-clarity of industrial fluids.*

CFC FILTERS — *Selective filtration of oils • water-oil separators • magnetic separators • pre-coat filters • coolant clarifiers • automatic tubular conveyors.*

Check 1059 opposite last page

NEW SOLUTIONS

Grease-kettle blending oil heated by waste flue gas from firing chamber

Processing time is reduced by preheating of oils

Installation of 1800-gal. double-motion grease kettle has permitted more efficient production of larger batches at Ontario Lubricating Company, Ltd., Hamilton, Ontario. Closer control has resulted in a smoother, more-uniform product.

In kettle design, waste flue gas from firing chamber is used to preheat blending oils. Thermostats, located in preheat tanks, control dampers which automatically admit or vent flue gas as required. Such preheating reduces processing time per batch.

Efficient, 1800-gal. double-motion grease kettle produces more uniform product

Kettle employs product-loaded, drag-type scrapers which eliminate burned or charred sidewall products so that heat-up is fast and uniform.

(Double-motion grease kettle is product of Buflovak Equipment Division, Blaw-Knox Company, 43 Winchester Ave., Buffalo 11, N.Y.)

Check 1060 opposite last page.

For more information on product at right, specify 1061 . . . see information request blank opposite last page.

GUIDANCE...

It was only when man recognized nature's navigational "signposts" in the skies, and learned to read them, that he gained mastery over the seas.

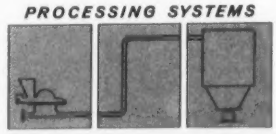
In the same way, the processing industries have welcomed guidance, and utilized every opportunity designed to help them toward more efficient and economical operation. Our contribution — in the field of grinding, air conveying and dust collection — is embodied in the Mikro Plan. The Plan includes: *Mikro Engineering, which works constantly to create equipment for new uses and to improve existing methods . . . Mikro Laboratory Analysis, aimed at more effective methods of processing customers' materials . . . and Mikro Service, organized on a world-wide basis for on-the-spot solution of problems, and the shipment of genuine MIKRO replacement parts to any point within 48 hours of order.*

Our experience and facilities are at your disposal without obligation. Call on us at any time.

MIKRO-Products

SPAN THE GLOBE

PROCESSING SYSTEMS



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Pulverizing Machinery Division • Metals Disintegrating Company, Inc.
85 Chatham Road • Summit, New Jersey

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MANUFACTURING FACILITIES: United States, Canada, Continental Europe, British Isles.

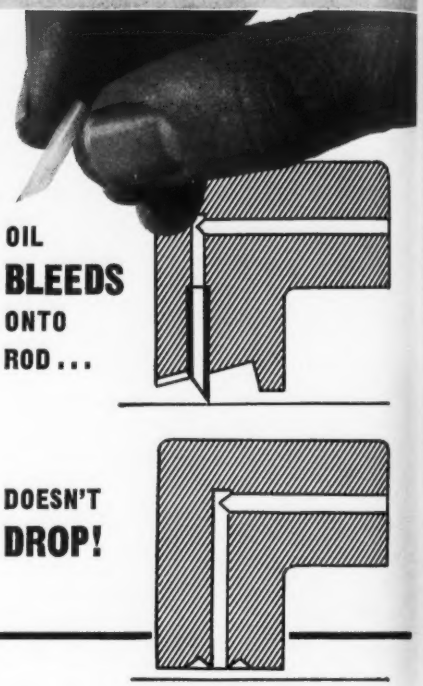
ENGINEERING

NEWS YOU CAN USE ABOUT ENGINE AND COMPRESSOR PERFORMANCE

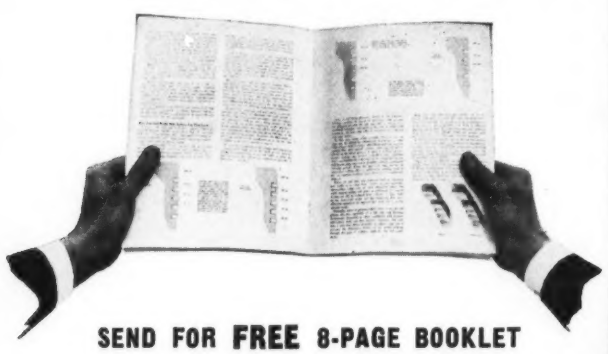
EXCLUSIVE NEW COOK QUILL* ASSURES BETTER LUBRICATION OF HIGH-PRESSURE PACKINGS

Oil "dripping" has caused a lot of trouble in high-pressure packings. The surface tension of the heavier oils tended to foul the nozzle, bleeding the lubricant down inside the cup bore instead of on the rod. Result: intermittent feeding or none at all. A new Cook-engineered drip nozzle design has solved this problem. Key to the new design is a Teflon quill that extends beyond the cup inner bore and actually *touches* the rod. Even after long wear, the quill will be within a few thousandths-of-an-inch of touching the rod. Thus, oil gradually bleeds onto rod . . . doesn't drop. This means that it will maintain a satisfactory oil film on the rod at all times. The exclusive quill is now standard on all Cook steel packings from 4,000 PSI upward. Ask a C. Lee Cook representative to give you the details.

**Patent Pending*



"IMPROVE YOUR PISTON RING PERFORMANCE"



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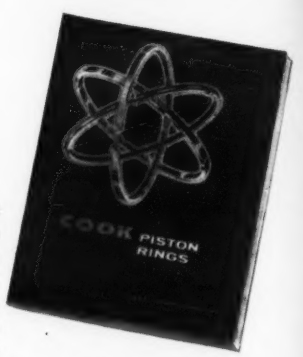
Write for your free copy of this technical article. Gives valuable data on improving your engine's performance and keeping it high for longer periods by better cylinder sealing. Offers practical advice on (1) how to tell whether rings should be reused or replaced, (2) choosing a ring setup, (3) relieving top ring load, and other problems. In short, it's a brief, handy guide to better piston ring performance. For your copy, write C. Lee Cook Company, 932 So. 8th St., Louisville 3, Ky.

WRITE FOR COOK'S NEW PISTON RING CATALOG



Sixteen-page catalog just off the press. Describes complete line of piston rings manufactured by C. Lee Cook Company, also the special rings of the Airtomics Division. For your free copy, write: C. Lee Cook Company, 932 South 8th Street, Louisville 3, Kentucky.

C. LEE COOK COMPANY

Division of Dover Corporation

Rings and Packings Since 1888

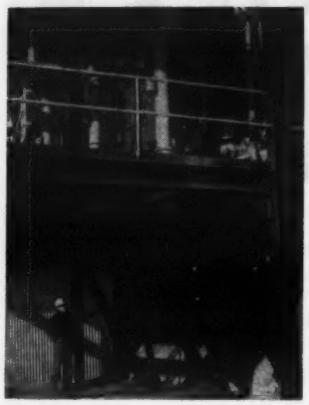
Check 1062 opposite last page

Path of least resistance for lime-dust particles is polyethylene pipe

Problem: Lime-dust particles from air filters did not pass freely through 8″ steel pipe at Syracuse, N. Y., plant of Solvay Process Division of Allied Chemical Corporation. This resulted in dust bridging in pipe and filling up hopper.

Tubular air-filter system was installed to alleviate dust problem created by burning of large quantities of limestone in plant. Capacity of installation is 25,000 cfm.

Three 18′ lengths of 8″ steel pipe were installed beneath filters at 45° angle to carry lime-dust discharge from collecting bins above to recovery conveyor inside building.



Polyethylene pipe carries lime-dust particles from tubular air-filter collecting bins above to recovery conveyor in building

Solution: Three 18′ lengths of 8″ pipe, of ultra-high-molecular-weight polyethylene, were substituted in place of the steel pipe.

Results: Smooth interior surface of pipe offered no appreciable hindrance to passage of lime dust. Time and money have been saved through continuous, reliable operation.

(Polyethylene pipe is product of Semet-Solvay Petrochemical Division, Allied Chemical Corporation, 61 Broadway, New York 6, N.Y.)

Check 1063 opposite last page.

YARWAY IMPULSE* is the only steam trap that continually samples fluid in the line to maintain condensate discharge close to steam temperature, eliminating condensate as soon as it forms.

Condensate seals the small control orifice against steam leakage under all normal operating conditions.

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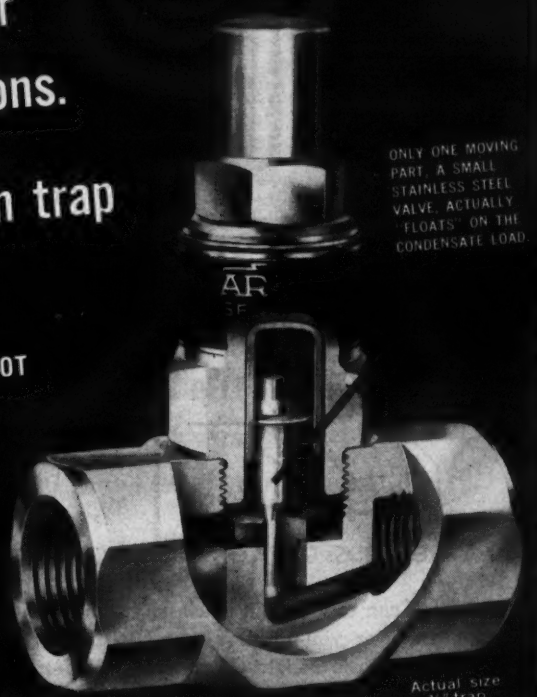
7. COMPLETE LINE FOR EVERY REQUIREMENT



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Check 1064 opposite last page

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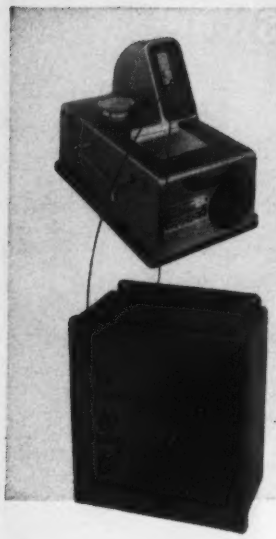
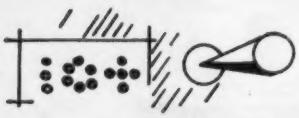
...new aid for controlling your quality and costs



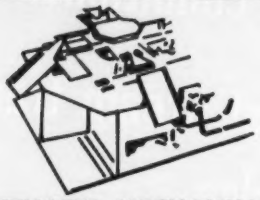
CHECKWEIGHS products packages and assemblies

CLASSIFIES by weight

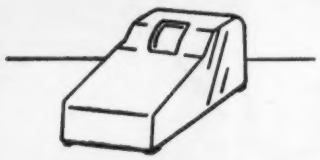
. . . and through electronic controls, performs these and many other remote functions!



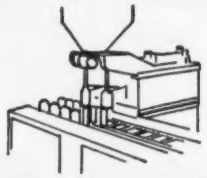
OPERATES SIGNALS



ACTUATES MECHANISMS



RECORDS DATA



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Now you can checkweigh or classify items by weight and utilize the data wherever you need it — and in the form that best fits your needs. The Basic Weight Classifier, employing Shadograph Scale with photocell controls, provides electronic signals which indicate correct weight, or over or under within pre-set limits. Any number of classifications from 2 to 128 may be used. Units are available to handle items in any shape in a capacity range from 2,000 milligrams to 100 lbs. Write for Bulletins 3333 and 3347.

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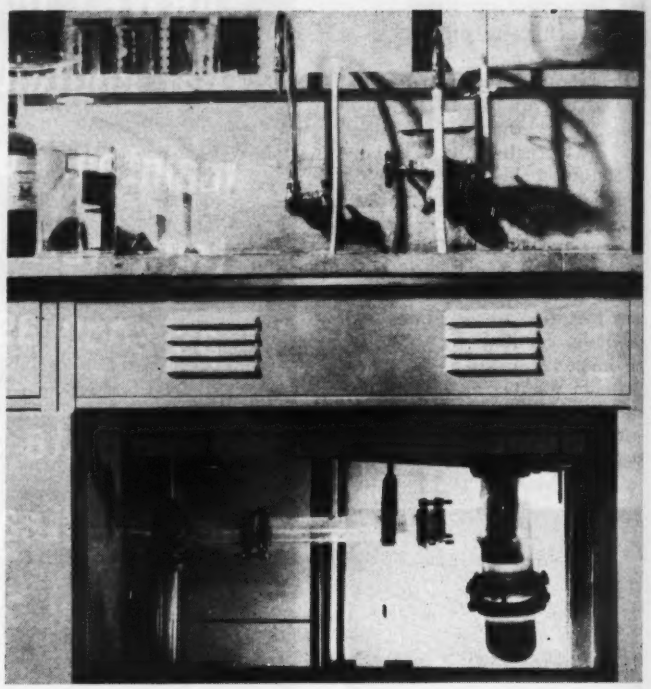
Check 1065 opposite last page

NEW SOLUTIONS
of processing problems



Research and development work at American Viscose Corp. involves use of a broad range of corrosives which find their way into the drainage system. In new Research Center, drain maintenance is minimized by glass drain system that . . .

Stands up to all research corrosives

Problem: Multiplicity of strong acids, alkalis, and other corrosives in small volume to be fed to drain lines at American Viscose Corp.'s Marcus Hook, Pa., Research Center prompted careful consideration of drainline materials of construction. Fundamental investigation into properties of fibers, films, and plastics were coupled in the labs with design and development of equipment needed to translate chemical processes into commercial production.

Previous experience with compounds involved had shown that selection of improper materials for lines could be a constant, costly maintenance headache. Combined heat and chemical attack caused many maintenance problems.

Solution: Drawing on knowledge gained in using glass piping for handling sulfuric acid in rayon manufacture and a test installation in one of the smaller labs, American Viscose turned to glass

Glass drain line for laboratory sink handles wide variety of acids and alkalis at American Viscose Corp. All-glass drain system for Research Center provides maintenance-free service

for new lab drainline system.

Pyrex brand borosilicate glass piping was installed in sizes ranging from 1½ to 6 inches in diameter. One straight-away run extends 300 ft; other runs are 210 and 175 ft in length. Joints are made with standard flanges, drawn together with bolts using interface gaskets of Teflon. (Other gasket materials, depending on fluid to be conveyed, include rubber, neoprene, or Koroseal.) Fittings used include both 45 and 90 ells, Y laterals, tee joints, and reducer couplings.

Lead-off stubs were included in system to provide future connections for planned expansion.

Results: Light weight of glass piping resulted in simplified hanging, longer lengths of piping for straight-away runs, and fewer joints.

Low coefficient of expansion of glass gives it needed thermal shock resistance.

Performance to date (over a year) has been excellent with no maintenance costs. Ground joint in glass system permits pressure seals for leaktight connections.

(Pyrex brand borosilicate glass piping is a product of Corning Glass Works, Corning, New York.)

Check 1066 opposite last page.

NEXT MONTH

Accurate proportioning of paper machine furnish components is a key to quality paper. Next month you will learn about International Paper Co.'s system for automatic proportioning of pulp stocks and chemical additives.

Any density-any capacity

Flexmount for light duty service uses leaf springs. These oscillating conveyors are ideal for gentle handling of free-flowing materials in lighter duty applications. They're fabricated in widths of 8, 12, 18 and 24 inches —with 4-in. deep troughs. *Available from stock.*

Coilmount for medium duty service uses coil springs. Designed for moderate applications handling mildly abrasive and bulk materials. Coilmounts are available in 10 and 20-inch widths with 6-inch deep troughs. They are shipped in assembled sections, making installation costs low. *Available from stock.*

Torqmount for heavy-duty service uses torsion bar springs. Engineered for severe service where capacities run as high as 500 tons per hour. Torqmounts are rugged, dependable . . . require little maintenance. Trough is easily replaced . . . simply remove bolts securing it to channel frame.

One of these 3

LINK-BELT oscillating conveyors

will give low-cost,

surge-free flow of your material

No one type of oscillating conveyor is good for all types of duty. That's why Link-Belt builds a complete range of oscillating conveyors for all operating conditions and materials.

Only Link-Belt offers three different design units . . . each engineered for a specific type of service. Their design is the simplest in the oscillating conveyor field and each functions as near to NATURAL FREQUENCY as possible to minimize power requirements. And Link-Belt FULL-TIME POSITIVE ACTION controls the load at all times . . . assures continuous, uniform flow of materials regardless of surges.

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Check 1067 opposite last page

How Blaw-Knox cuts your power piping costs

121,000 square feet of space at your service. Power piping facilities at Pittsburgh include 56,000 square feet of plant area and an additional 65,000 square feet for exterior storage. An additional new plant is located on a 15-acre site in Jackson, Mississippi.

Your job is under the personal supervision of an experienced engineer, who follows your project from beginning to end. Your piping is handled with the most modern equipment for welding, heat treating, and bending. Fabricating techniques, proven by rigid testing, are used.

New product development. Blaw-Knox developed an enclosed type of functional spring hanger as part of their complete line of hangers for supporting any piping system. Here a group of hangers individually designed for a project is factory checked to assure fast field erection.

Stress calculation cut from months to a day . . . with pace-setting engineering. An exclusive Blaw-Knox method uses an electronic computer for automatic computation with no limitation on the complexity of system. Full accuracy, with tremendous savings in time and cost. Write for details.

BLAW-KNOX

BLAW-KNOX COMPANY
Power Piping Division
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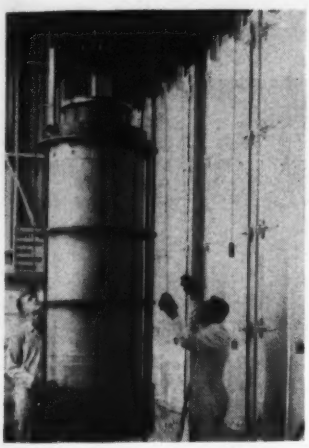
For more information on product at left, specify 1068 see information request blank opposite last page.

Solid rocket fuels 'baked' in steam-heated ovens

Solid-propellant charges are heat-cured to a black, rubbery solid in final stage of rocket-engine production at Marshall, Texas, plant of Thiokol Chemical Corp.

Liquid polymer is mixed with oxidizer to become both



Rocket-engine casing with propellant being readied for baking

fuel and binder for charge. Thin coating of propellant is sprayed in casing and cured in ovens.

Core is then inserted in rocket-engine casing, and main charge is poured around it. Entire engine is baked in oven, core is withdrawn, and rocket is ready to fire.

(Steam-heated industrial ovens are product of Despatch Oven Company, 619 S. E. 8th St., Minneapolis, Minn.)

Check 1069 opposite last page.

Sewage-sludge pump holds up under wear of rags, glass

Sludge-line grease buildup also eliminated

Problem: Broken glass, rags, and pebbles were wreaking havoc with pumps having hardened cutter blades.

Pumps were used to transfer sludge from basins to digestion tanks at East Bay Municipal District, Special

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While these Standards are packed with vital data on the design, fabrication and erection of industrial and high pressure—high temperature piping, they do not explain the many advantages of shop fabrication.

Shop fabrication by firms responsible for the development of P.F.I. Standards is your only real assurance of meeting the most exacting requirements of piping, whether it's welded, bent, coiled or vanstoned . . . in any metal as a component or a complete assembly.

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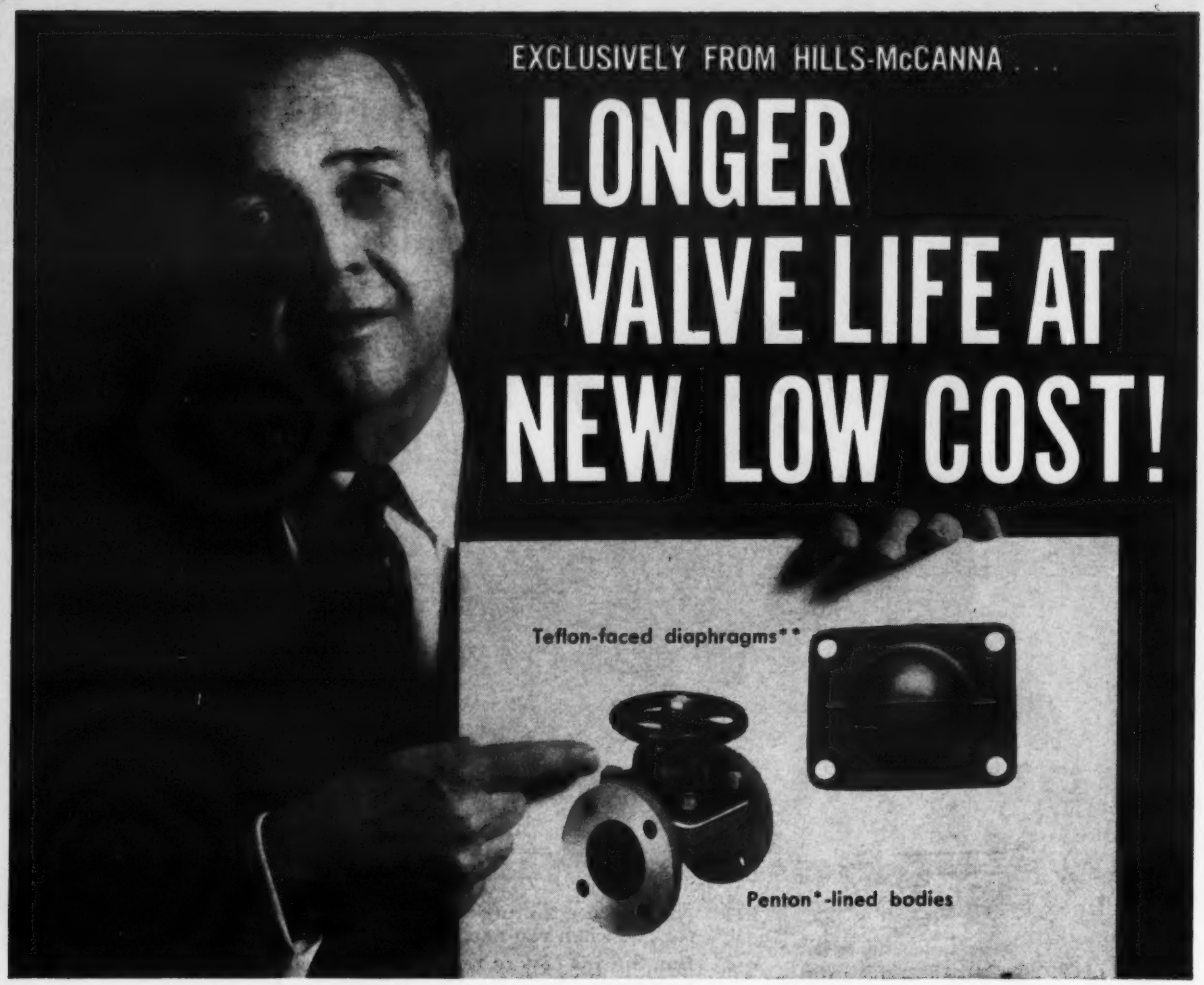
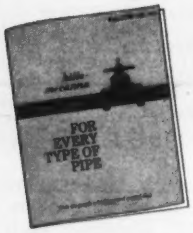


Hills-McCanna Diaphragm Valves—lined with Penton plastic and equipped with one-piece Teflon-faced diaphragms—are ushering in a whole new era of extra valve life and lower valve costs.

PENTON-LINED VALVES are suitable for operating temperatures up to 300°F. Penton-lined valves will save you money because they meet many service requirements that formerly called for costly stainless steel or glass-lined bodies—yet are competitively priced with rubber-lined valves. In addition to having superior corrosion resistance, they are non-contaminating—cannot affect a product's taste, aroma, or color—work equally well with metallic, plastic, glass or lined piping.

TEFLON-FACED DIAPHRAGMS are suitable for temperatures up to 240°F. They can handle concentrated sulphuric or hydrochloric acids, chlorinated hydro-carbons, and esters. The Teflon facing is permanently bonded to an elastomeric backing—provides long life, assures positive closure. Teflon-faced diaphragms save you money because they often meet the same service requirements as solid Teflon diaphragms at much lower cost.

*Penton is a registered tradename of Hercules Powder Company.
**Patent applied for. †Teflon is a registered tradename of E. I. Dupont.



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Check 1071 opposite last page

NEW SOLUTIONS

District I, primary-type sewage-treatment plant in Oakland, Calif.

Debris slipping through bar screens and grit chambers resulted in excessive maintenance costs for both pump repairs and blade sharpening. Congealed grease in sludge lines was also a problem.

Solution: Progressing-cavity type pump was installed. Operation of this pump is similar to precision screw

Pump has handled sludge and debris for 19 months without downtime for maintenance

conveyor. Test-installation rotor was turned at 310 to 620 rpm by 7½-hp motor.

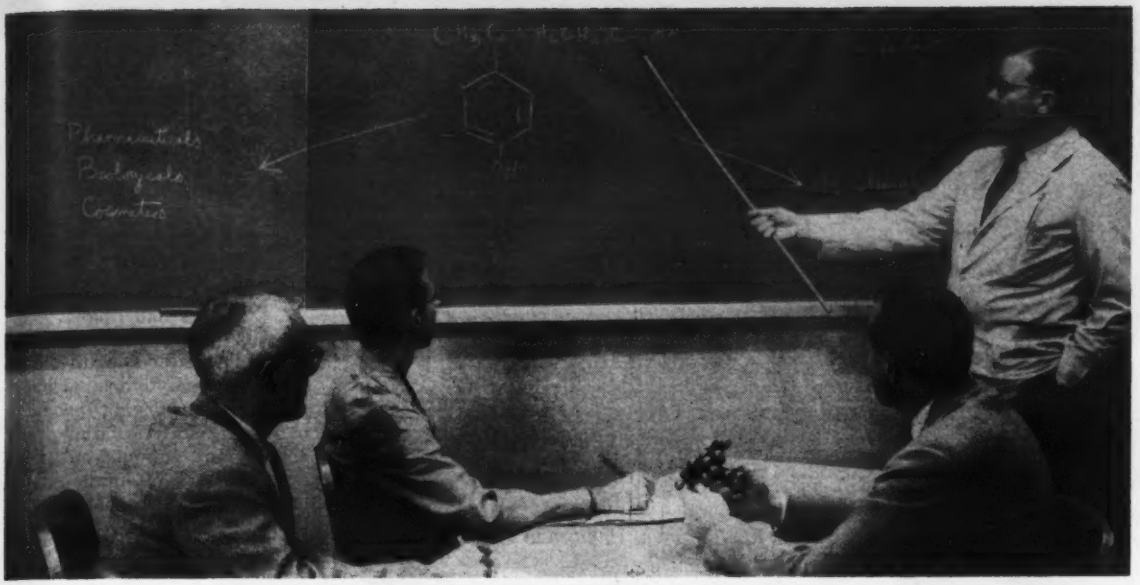
Results: Inspections were initially made every 24 hours. They were gradually stopped. Each inspection revealed some rags wrapped around motor, but not enough to affect desired discharge rate of 80 to 160 gpm. Uniform discharge and constant pressure prohibits any grease buildup.

Sudden drop in capacity occurred after 19 months of full-capacity operation. A large sharp object had torn piece from rubber stator. Stator and rotor were replaced. This cost was less than that normally incurred in a single repair of previously used pump.

(Moyno progressing-cavity pump is product of Robbins & Meyers, Inc., 1934 Clark Blvd., Springfield, Ohio.)

Check 1072 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



Dr. John Pearce, applied research director (standing) discusses end-use possibilities of DPA with (clockwise) Dr. Mark Bealor, senior chemist; Francis Stratton, chemist; and Dr. R. V. Smith, organic research supervisor

Long a leader in chemical specialties, S.C. Johnson & Son, Inc., recently revealed plans to jump the fence into the field of basic chemical suppliers. First product into the starting gate is Diphenolic Acid, where . . .

Eight Reactive Sites Set the Pace for Versatile Intermediate

USES: Polyfunctional granular solid can be utilized as component or raw material for a multiplicity of products. It shows most promise as a resin and coating building block. In addition, initial investigations have produced interesting plasticizers, surface active agents, oxidation-corrosion inhibitors, and compounds with fungicidal, bacteriocidal, and insecticidal action.

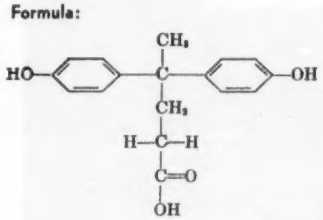
Features: Diphenolic Acid (DPA), chemically 4,4-bis-(4-hydroxyphenyl) pentanoic acid, has eight reactive sites to permit a wide variety of chemical modifications:

1. Two phenolic hydroxyl groups.
2. Four condensable hydrogens — two on each benzene ring.
3. One reactive carboxyl group.
4. Alpha alkyl hydrogen.

Predicted to run in 35-40c/lb price range, DPA's cost and versatility should make it uniquely suited for preparation of a wide variety of synthetic esters, amides, and polyhydric phenols subject to further modification to resins. In contrast to alkylidene bisphenols, it is possible to build plasticizing agents and unsaturation into same molecular structure. Characteristics previously available only from two or more separate chemicals can now be combined in one. Compromise, often necessary for reasons of compatibility in formulating for desired properties, can be eliminated.

Description: Diphenolic Acid is produced by condensation of phenol and levulinic acid in presence of a mineral acid such as hydrochloric. Reaction temperature is approximately 140°F. Crude DPA is purified, filtered, washed, and dried to yield a product with following characteristics:

Formula:



Molecular weight:	286.31
Physical properties:	
Appearance	light tan granules
Odor	slightly phenolic
Melting point, °C	167-172
Acid number	190-196
Purity, min %	97

Compound is soluble in acetic acid, acetone, ethanol, ethyl acetate, isopropanol, methyl ethyl ketone, and hot water. It is insoluble in benzene, carbon tetrachloride, ethyl ether, n-hexane, cold water, and xylene.

Diphenolic acid will undergo expected reactions of both a para substituted alkyl phenol and a carboxylic acid. The phenolic hydroxyl can be readily esterified and etherified.

Reactions involving aromatic ring substitution include alkylation, acylation aldehyde condensation, carboxylation, halogenation, nitration, and sulfonation. Carboxylic acid portion of the molecule can

Pilot plant facilities have a capacity of 20,000 lb/mo. Full scale production equipment should be ready in about a year

at El Dorado

Uniformity is FOREMOST

SEE one drum and you've seen them all. Each drum of El Dorado coconut oil fatty acid or methyl ester looks, feels, tests and works like every other for the *purity* and *uniformity* of your formulations.

That's why El Dorado esters, acids and oils have been famous for quality and dependability for over 65 years . . . because at El Dorado, Uniformity is Foremost.

EXAMPLE: All Eldo Lauric 96 shipped last year exceeded 97% purity—the purest, most uniform Lauric Acid available.

Supplies stocked near you. Write or phone today for samples and specifications. Department B-1

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Laurate Myristate Palmitate
Oleate Eldo* 18 Coconate

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Oakland: Foremost Food & Chemical Co.
Oklahoma City: Rullman Brothers
St. Louis: Harry A. Baumstark & Company

Check 1073 opposite last page

undergo esterification, amidification, acid hydrazide and salt formation. An interesting and useful reaction is self-esterification.

Hydroxylated or epoxidized resins or oils can be modified by esterification with DPA.

Coatings and Finishes

Coesterification with fatty acids and polyhydric alcohols produces air-drying products exhibiting superior film properties. In comparison with epoxy esters of similar fatty acid content DP coesters exhibited:

1. Significantly shorter drying times.
2. Superior rocker hardness.
3. Superior resistance to both cold and hot water.
4. Comparable shelf color and lighter film color.
5. Similar solubility characteristics except at higher fatty acid levels where DPA formulations are soluble in aliphatic solvent.

Here is a comparative evaluation at a fatty acid level of 42%:

	DPA	Epoxy
Viscosity (Gardner-Holt)	A	A
Nonvolatile %	30	30
Shelf color	6	6
Sol ratio %		
Aliphatic	60	60
Aromatic	40	40
Drying data:		
Set to touch	8 min	17 min
Tack-free	37 min	121 min
Cold water (48 hr)	Excel	Blush-recovers
Boiling H_2O	6 hr blush-no recovery	10 min white-no recovery
Alkali 5%	22 hr-blush	22 hr-blush
Hardness (Rocker)	33	27

Ester condensation products with DPA combine chemically in same molecular structure a high degree of formaldehyde reactivity with added benefit of internal plasticization. Films formed have good flexibility and chemical resistance.

A typical high-performance coating is prepared by esterifying DPA (66.3%) with linseed fatty acid (21.6%) and

To page 60

THAT'S INTERESTING

Half-life versus $$

The case of aluminum-26 is good illustration of factor of half-life versus production expense. Having half-life of 200,000 years, aluminum -26 would seem to be a natural as a stock isotope. But, it would take about ten years of continuous cyclotron bombardment to make one millicurie of Al^{26}, and would cost over one million dollars.

Crime deterrent

Quick-drying plastic spray developed by Atlantic Research Corp. is found to produce better reproductions of latent fingerprints than methods now in use. Film produced by spraying plastic over dusted print may be stripped from object sprayed and may be stored in master record file. Photographic reproductions may be made from master print.

For more information on product at right, specify 1074 see information request blank opposite last page.

Symbolized here is the uncontrolled (multi-point and premature) surface ignition on hot engine deposits that results in abnormal pressure rise and engine noise in some high-compression automobile engines. Driving conditions breed a problem too. Start-and-stop driving that builds excessive deposits is prime offender.

ATTACK ON A NEW KIND OF ENGINE KNOCK...

Celanese compounds modify engine deposits, improve combustion, reduce noise

Two great industries face a real problem in uncontrolled combustion—which results in a rumbling vibration in the higher compression engines of some of today's automobiles. This new kind of engine knock not only disturbs car owners — it puts limits on compression ratios, gasoline composition, and potential engine efficiency.

Among fuel additives researched to combat abnormal combustion, only the organo-phosphorus compounds have been able to help; they modify the composition of hot engine deposits, thus control surface ignition, and reduce excessive pressure and engine "screaming."

Since the first phosphorus additives were introduced into motor fuels a few years ago, Celanese has been a leading supplier to a growing number of gasoline refiners. And indeed, phosphates — which we have been producing for 35 years—are only one member of a huge family of Celanese chemicals basic not only to the automotive and petroleum industries but to scores of others as well.

Whatever *you* produce, whatever your problem, perhaps there is some way in which we can serve you, too. Celanese Corporation of America, Chemical Division, Dept. 591-D, 180 Madison Ave., N.Y. 16.

Celanese®

Basic reasons .....

Acids	Functional Fluids	Polyols
Alcohols	Gasoline Additives	Plasticizers
Aldehydes	Glycols	Salts
Anhydrides	Ketones	Solvents
Esters	Oxides	Vinyl Monomers

Celanese CHEMICALS

.....for improved products

Agricultural	Paper
Automotive	Pharmaceutical
Aviation	Plastics
Building	Surface Coating
Electrical	Textiles

Export Sales: Amcel Co., Inc., and Pan Amcel Co. Inc., 180 Madison Avenue, New York 16, N. Y. • Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver

Nalco CHEMICALS

Probably unusual in 10,000,000 B.C., too!

The life line of this monster is modern, but it has a "two-headed" characteristic that may be useful to you. It is called Nalquat G-8-13; a quaternary ammonium chloride that is soluble in *both* hydrocarbons and water. It makes clear solutions in water and most hydrocarbons at concentrations of 50% or higher . . . a highly unusual feature for a high-molecular-weight electrolyte. In fact, we know of *no other* ionic surfactant so endowed.

Among its known uses, it is an excellent emulsifier — especially for tough customers like orthodichlorobenzene . . . a corrosion inhibitor in acid systems (particularly where oil is present) . . . a dispersant for carbon black and fillers in rubber . . . and a fine bactericide, even in solutions below pH7.

If Nalquat G-8-13 sounds as if it might have possibilities in your projects, products or processes, let us send you full details, with a sample, if you wish.

NATIONAL ALUMINATE CORPORATION

6294 West 66th Place, Chicago 38, Illinois

In Canada: Alchem Limited, Burlington, Ontario

Nalco® PRODUCTS

Serving Industry through Practical Applied Science

Check 1075 opposite last page

Versatile Intermediate

From page 58

pentaerythritol (12.1%), and condensing with formaldehyde at a mole ratio CH_2O/DPA of 5:1. Hydrochloric acid is used as a catalyst. Film is baked at 250°C for 15 min. Resulting coating is hard and tough.

To evaluate coating, tests were run according to Government Specification MIL-V-12276A for phenolic baking varnishes, particularly where commercially available high-performance coatings showed deficiencies. Film had excellent resistance to cold and boiling water. Unlike majority of available coatings in this class, it exhibited good flexibility in addition to adhesion and chemical resistance. After boiling for two hours in dichloroethylether, film showed only a slight color change. It was still good after seven hours in boiling water.

Sales manager for DPA, Jim Bown (left) talks over disposition of pilot-plant output with W. H. Keland, manager of "DPA" Enterprise and Grant P. Lawless, experimental engineering supervisor

Currently being produced on a developmental scale (pilot plant capacity is 20,000 lb/mo), introductory samples and test quantities of DPA are available. Approximately 12 months will be required to prepare full production facilities.

(Diphenolic Acid is a product of S. C. Johnson & Son, Inc., Racine, Wis.)

Check 1076 opposite last page.

Hallco HA-5A

High Molecular Weight

Polymeric Plasticizer

for use with
Vinyls
Cellulosics
Synthetic Rubbers
Polymers

to prepare
Sheeting
Coated Fabrics
O-Rings
Molded Goods
Gaskets
Wire
Tapes
Cable

check these features
- Exceptional Permanence
- Excellent Compatibility
- Resistant to Ultra-Violet light
- Non-extractable
- Non-migratory

THE FLAME AND THE FLASK Symbol of Quality

Ask for information about other Polymeric Plasticizers available for specific applications.

The C. P. Hall Co.
CHEMICAL MANUFACTURERS
5245 W. 73rd St., Chicago 38, Illinois
NEWARK • AKRON • CHICAGO
MEMPHIS • LOS ANGELES

Check 1077 opposite last page

Polyindene resin suited for ink manufacture

Scuff-resistance imparted to floor wax

Uses: In printing ink, wax, and varnish manufacturing.

Features: In manufacture of printing ink, resin offers desirable solvent release and solution viscosities at various levels in kerosene, ink oil, normal heptane. Product imparts good scuff resistance, gloss, and hardness to floor waxes.

Description: Physical properties of polyindene resin follow:

Melting point	130-140°C
Flash point (COC)	500°F min
Specific gravity	1.04-1.06
Ash	under 0.2%

Resin is available in solid and flaked form, as well as in 60% solution of mineral spirits.

(Piccovar C-130 polyindene resin is a product of Pennsylvania Industrial Chemical Corporation, 119 State Street, Clairton, Pa.)

Check 1078 opposite last page.

Gardner color below 1 for paint mildewcide and fungicide

Uses: Imparts mildew and fungus resistance to paints.

Features: Gardner color is well below 1. Material is stable and compatible as additive with broad range of oil, alkyd, latex, and water-based paints.

Description: Puratol-30 is a phenyl mercury compound. Phenyl mercury runs 30% (as oleate); minimum equivalent mercury is 10.77%. Specific gravity is 0.94, flash point (TCC) 145°F, max water content 0.25%. It's fully soluble in petroleum solvents.

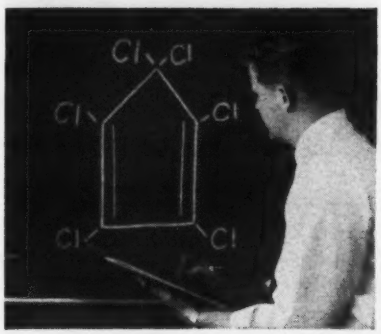
An average of 0.5%, based on total weight of the paint, is adequate. Product will not affect color, viscosity, drying, other paint characteristics.

(Puratol-30 is formulated by Gallowhur Chemical Corporation, Ossining, N. Y.)

Check 1079 opposite last page.

BRIEFS

on a highly reactive chlorocarbon . . . how to gauge a supplier . . . a general products list of Hooker chemicals . . . data on phosphorus-sulfur compounds



Why you should know more about C-56

The six active chlorines around this cyclopentadiene group are an open invitation to the study of derivatives such as acids, acid chlorides, acid anhydrides, esters, amides, ketones, *di*-ketones, quinones, acetals, nitriles, and fluorocarbons.

Many of these end products have already found markets as insecticides, germicides, fungicides, pharmaceuticals, dyes, and non-flammable resins.

We think the surface has just been scratched . . . that there are many more profitable products waiting to be developed by a company with imagination.

If you think you're the one, send the coupon for more technical data. If you like, ask for a sample, using your business letterhead.

Is your supplier growing with you?

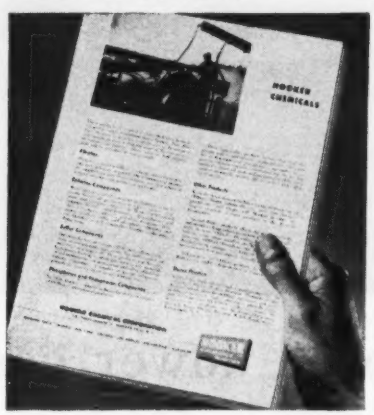
You have much to gain by tying up with a chemical supplier geared to the spread of industry into new areas, accustomed to anticipating your requirements of tomorrow, even while serving you dependably today.

Close to the major industrial centers of the East, Midwest, and West Coast, Hooker plants and stock points give you quick, dependable service when you need it. All Hooker caustic soda plants and distributing points are on deep water. This makes transportation extremely flexible. It tends to minimize shipping costs, and permits a choice that can make a big difference if an emergency occurs.

And if you buy l.c.l., there's an authorized Hooker distributor nearby, ready to meet your needs for caustic soda and other Hooker chemicals.

If you'd like to see how this flexible, fast-moving supply team can strengthen your position on chemicals, drop us a line and we'll get the facts to you promptly.

New 12-page bulletin lists Hooker products



You'll find a complete up-to-the-minute listing of Hooker chemicals in this new 12-page bulletin.

Indexed for ready reference, it lists the chemicals you can buy from us in commercial quantity, including chemicals sold under the NIALK® and OLDBURY® brand names.

Under each product you'll find a short description and condensed listing of properties, actual and suggested uses, and shipping containers. The bulletin also sums up for you the major types of processing performed at Hooker.

If you'd like to have this up-to-date timesaver in your file or on your desk, just check the coupon for a copy of new *Bulletin 100-B.*

Here's data on phosphorus-sulfur compounds

Every time you strike a match, you're helping to justify the market researchers' predictions for one of our OLDBURY Products: red phosphorus.

This fascinating element got off to a commercial start in this country in 1910, on the site of the present OLDBURY Products plant in Niagara Falls.

Today many other items that must burn up before they can do anyone any good are made with OLDBURY *red phosphorus* or *phosphorus sesquisulfide,* P_4S_3. These include matches, fireworks, safety and signal flares, fusees, and smoke screens.

Your product may require another equally useful, though less dramatic, way of putting phosphorus to work:

Phosphorus Pentasulfide, P_4S_{10}. We make it in three particle-size grades of powder and as a fused solid. Phosphorus content is 27.8% minimum. Powder forms come in lever-pak drums, 150 lbs. net; solid in single-trip steel drums, 215 lbs. net.

These products are available, as always, under the highly reputed OLDBURY label. For more information, we suggest you check the coupon for new technical data sheets just completed.

For more information on chemicals mentioned on this page, check here:

- ☐ C-56
- ☐ New list of products—Bulletin 100-B
- ☐ Phosphorus, white
- ☐ Phosphorus, red
- ☐ Phosphorus Pentasulfide
- ☐ Phosphorus Sesquisulfide

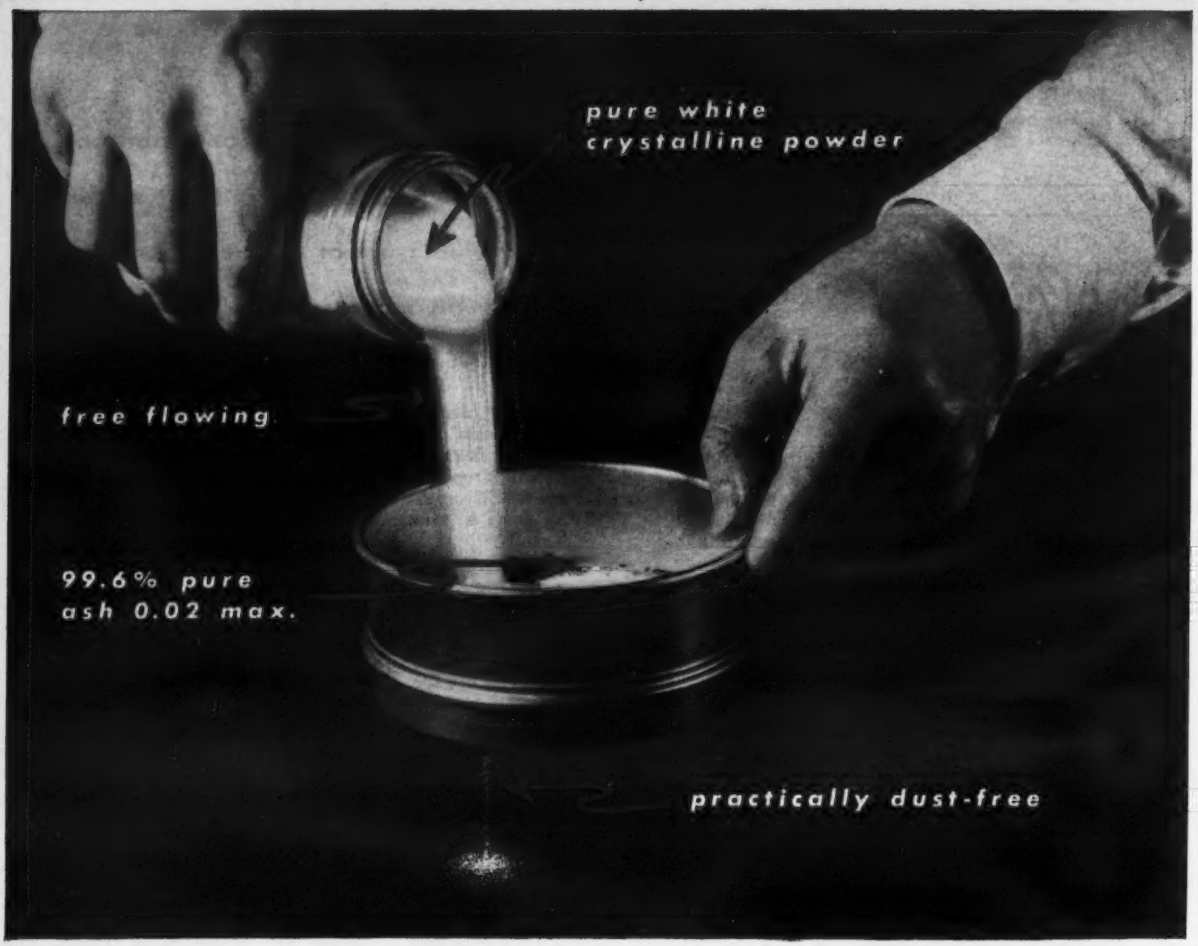
Clip and mail to us with your name, title, company address. *(When requesting samples, please use business letterhead.)*

HOOKER CHEMICAL CORPORATION
504 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

Sales Offices: Chicago Detroit Los Angeles New York Niagara Falls Philadelphia Tacoma Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B.C.

HOOKER CHEMICALS PLASTICS

Check 1080 opposite last page



lighter colored, lower cost end-products start with National® FUMARIC ACID

National Fumaric Acid has the ideal combination of chemical and physical properties for better polyesters, alkyds, ink and varnish resins, drying oils, plasticizers, pharmaceuticals, etc.

It is made by an exclusive direct catalytic-oxidation process in the world's largest Fumaric Acid plant by America's oldest volume producer. It gives absolutely uniform results and yields consistently uniform end-products.

And, as an added economy, you get mixed carload or mixed truckload prices on combination orders with any of the National Resin Chemicals listed from plant or principal branch warehouse stocks.

So, for lower cost, lighter colored end-products, always start by ordering National Fumaric Acid.

Maleic Anhydride • Fumaric Acid • Phthalic Anhydride • Adipic Acid
Succinic Anhydride • NADONE® Cyclohexanone • NAXOL® Cyclohexanol
Tetrahydrophthalic Anhydride • Hexahydrophthalic Anhydride • Dodecenylsuccinic Anhydride • NADIC® Anhydride • NADIC® Methyl Anhydride • Succinic Acid

Allied Chemical

NATIONAL ANILINE DIVISION
40 Rector Street, New York 6, N. Y.

Atlanta Boston Charlotte Chicago Greensboro Los Angeles Philadelphia Portland, Ore. Providence San Francisco
Canada: ALLIED CHEMICAL CANADA, LTD., 100 North Queen St., Toronto 14.

Check 1081 opposite last page

CHEMICAL MATERIALS

Polyether used for rigid urethane foams

Improves aging and cuts water sensitivity

Uses: In preparation of rigid urethane foams, replacing the customary hydroxyl-terminated polyesters. Also suggested for investigation in urethane coatings and adhesives.

Features: Improved aging characteristics, reduced water sensitivity, more favorable economics.

Description: Niax Triol LK-380 is a semi-viscous Polyol polyether. Tentative specifications are:

Volatility, % by wt, max	0.2
Hydroxyl No., mg KOH per gm	361.9-400.1
Acid No., mg KOH per gm, max	0.2
Tot. Unsaturation, meq per gm, max	0.04
Water as shipped, % by wt, max	0.10
Ash, % by wt, max	0.005

Foams can be cured at room temperature, but a 30-minute cure at 95°C is suggested.

(Niax Triol LK-380 is product of Union Carbide Chemicals Company, Division of Union Carbide Corporation, 30 E. 42nd St., New York 17, N.Y.)

Check 1082 opposite last page.

"I think I accidentally left a Cobalt-60 capsule on your desk."

THAT'S INTERESTING

Manveyor

Instead of an elevator, man-carrying conveyor belt is shuttling coal miners in and out of a coal mine at Panther Gulch, W. Va. Manveyor runs down 20° slope making total drop of 97′. It carries miners 150 fpm, and three min transit time is faster than elevator. (*Industrial Research Newsletter,* Armour Research Foundation of Illinois Institute of Technology)

In the bag

Yachtsmen, duck hunters, and campers no longer need worry about space problems in boat storage. United States Rubber Co. has introduced a "duffle-bag" dinghy. It can be carried in a small case and inflated in seconds. It has two folding aluminum paddles, a hand pump, and two seats. inflated and ready for use, craft is 8½′ long. Carrying case is 35″ long with circumference of 14″.

For more information on product at right, specify 1083 see information request blank opposite last page.

Which of these 3 products and services can you use from BECCO?

What's new in Metal Treatments and Etching?

Quite a few things. For example, there's the use of Becco Ammonium Persulfate in etching printed circuits. Seems the material works a lot better – at less cost – and with none of the hazards of the ferric chloride solutions conventionally used.

Then, there's the problem of pickling copper and brass. Lots of pickling agents will do this – only trouble is, you've got to paint or plate or do whatever you're going to do with the metal rather quickly. Or else. Or else it will tarnish or oxidize and you're in the pickle all over again.

Not so with Ammonium Persulfate. Cleans fine. Puts a mild etch on the surface, too, for better paint or plating bonding. More important, perhaps, is the fact that the metal resists retarnishing for up to two weeks. Ideas?

We hope so. What's more, we've got several booklets to help spur you on. They're free—use the coupon below to order.

No. 39 and 51—Surface Treatment of Metals with Peroxygen Compounds.

No. 86 – Improving Properties of Copper and Brass Surfaces.

No. 97 – Paddle Etching of Printed Circuits with Ammonium Persulfate.

No. 99 – Tank Immersion Etching of Printed Circuits with Ammonium Persulfate.

No. 102—Etching of Printed Circuits with Mercury Activated Persulfate.

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York

Dept. CP-E

Gentlemen:
Please send me the following free bulletins:

☐ 39 and 51 ☐ 86
☐ 97 ☐ 102 ☐ 99

NAME_____

FIRM_____

ADDRESS_____

CITY_____

ZONE____ STATE_____

What's a PEROXYGEN?

Fact is, "peroxygen" is a word that Becco uses to indicate that we can tie oxygen onto just about anything.

How come? Well, years of experience in producing Hydrogen Peroxide has produced an affinity between Becco and oxygen — an affinity we have capitalized on to give you compounds that will provide a ready source of oxygen — wherever, however and whenever you need it.

We have a good number of such compounds on the shelves. Quite a few others are in development. Still others are merely in our minds, but we can begin drawing them out if you're interested.

We hope you are interested. But we'll never know—unless you fill in the coupon below and mail it to us. Why not?

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York

Dept. CP-D

Gentlemen:
Send me more information about Becco Peroxygen Chemicals.

NAME_____

FIRM_____

ADDRESS_____

CITY_____

ZONE____ STATE_____

Problems in handling Hydrogen Peroxide

?

Becco's Four-Fold Engineering Service Program—offered free—includes:

1. Comprehensive survey of your facilities.
2. Specific proposal with recommendation of proved equipment and where it is obtainable.
3. Installation supervision by Becco.
4. Periodic inspection and permanent service.

Can you use this free Becco help, based on more years of experience with bulk handling of H_2O_2 than any other manufacturer? Use the coupon to let us know.

BECCO fmc

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York

Dept. CP-B

Gentlemen:
Please tell me more about your Four-Fold Engineering Service.

NAME_____

FIRM_____

ADDRESS_____

CITY_____

ZONE____ STATE_____

ODRENES take the guesswork out of household product fragrance selection!*

When you use an ODRENE to scent your household product you can be sure of a competitive selling advantage. For every ODRENE is consumer-tested and accepted as a pleasing modern fragrance. You take no chances on its appeal!

You can also be sure of its technical performance in your product. For ODRENES are scientifically compounded to solve the unique problems of household products. They are versatile, easily adapted to the special requirements of your formulae, stable, and extremely economical to use.

May we demonstrate how these fragrances can solve your odor problem? Write for samples and the full cooperation of our technical staff.

**Odrene is the registered trade-mark for Sindar's series of fragrant additives.*

SINDAR® *Corporation*
Industrial Aromatics and Chemicals
321 West 44th Street • New York 36, N. Y.

Check 1084 opposite last page

KNOX
TOWER PACKINGS
Designed for Service!

More than 35 years production experience in the field of fine quality porcelain, plus the finest of materials . . . That's KNOX!

Tower Packings by KNOX resist high temperatures, fumes, vapors, corrosion, liquids, alkalies and acids. Non-porous—complete vitrification firing at 2300° F. provides zero porosity, assuring an indefinite life chemically. Combined with uniform quality, high chemical purity, iron-free, great mechanical strength, will not crumble.

Body composition excells the most exacting requirements.

IRON FREE

KNOX PORCELAIN CORPORATION
KNOXVILLE 1, TENNESSEE

Always Specify KNOX Tower Packings

Check 1085 opposite last page

A portion of the exhibit which was one of the focal points of the conference. Products shown graphically demonstrated broadened applications of reinforced plastics

Reports on broadened fields of application and indications of an accelerated rate of climb in sales volume were features of 14th Annual Conference of SPI's Reinforced Plastics Div. With uses in all fields showing increasing activity . . .

The "historic growth pattern" of the reinforced plastics industry hesitated only briefly in recession-burdened 1958. Annual market study of the Reinforced Plastics Div., The Society of the Plastics Industry, Inc., as reported at the 14th annual conference held in Chicago's Edgewater Beach Hotel, revealed that last year's record sales of 185-million lb represented a 10% increase over 1957.

A strong surge in January sales, forced upward a predicted 15% increase for 1959. Some industry leaders now expect gain to run between 20 and 25%. Allied Chemical Corp. reports January polyester sales highest in company's history. American Cyanamid sales reflected same upward trend "across the line." A rapidly expanding demand for chemical- and corrosion-resistant materials made January a "boom month" at Atlas Powder Co.

Use Patterns

During 1958, the boating industry moved up to become largest user of reinforced plastics, accounting for 37-million lb or 20% of all material sales. Trays and containers are expected to be prime growth markets with pipe and ducting use growing in applications demanding high corrosion resistance.

Felix N. Williams, vice president, Monsanto Chemical Co., stressed the need for more information on capabilities of plastics being given to construction industry. He summoned plastics industry to job of "challenging the architects and consulting engineers to make full use of the new concepts of structural design that plastics make available to

Frank E. Pschorr, Ciba Products Corp., gives an interested audience rundown on reactive diluent for epoxies

Reinforced plastics head for another record year

escape the rectilinear."

Speaking at the closing day luncheon, he urged the leaders of the reinforced plastics industry to be sure that plastics, "talented youngsters with promising futures" take their proper place in a basic position among materials of construction.

Raw Materials

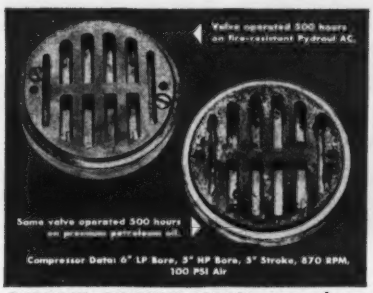
During the three day meeting, over 70 technical papers were presented. Dr. Hadden Clark of Esso Research and Engineering Co., outlined the potential of C-oil, a liquid copolymer of butadiene and styrene in a weight ratio of 80/20, in reinforced plastics applications. Already in product development stage as a surface coating raw material, product's properties of low density and water resistance together with optical clarity and easy pigmentation indicate varied application areas.

A reactive diluent for epoxies, 1, 4-butanediol diglycidyl ether, was subject of talk by E. Pschorr of Ciba Products Corp. High flash and boiling points distinguish this compound which can be used to lower viscosity of epoxy resins while maintaining their desirable properties.

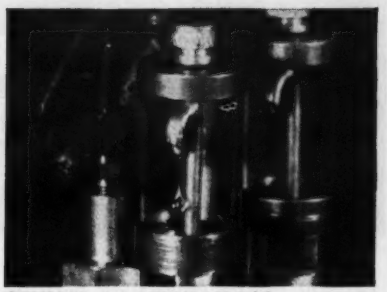
Plant Maintenance

One aspect of reinforced plastics application which has received little publicity was subject of paper presented by J. P. Barker, Celanese Corporation of America. "The Use of Reinforced Polyester Resins in Plant Maintenance" highlighted pipe repair, upgrading of storage tanks, component parts of cooling towers, and panels in plant construction.

PYDRAUL AIR COMPRESSOR LUBRICANT GIVES 3 "MOST WANTED" BENEFITS AT LOWEST COST: LOW UPKEEP, PEAK LUBRICATION, FIRESAFETY

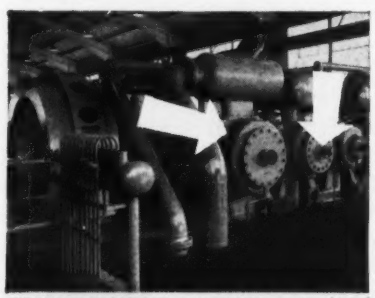

Valve operated 500 hours on fire-resistant Pydraul AC.
Same valve operated 500 hours on premium petroleum oil.
Compressor Data: 6" LP Bore, 3" HP Bore, 3" Stroke, 870 RPM, 100 PSI Air

PYDRAUL AC RUNS CLEAN—can substantially cut compressor upkeep costs because it reduces build-up of carbon and other deposits—extends time between overhauls. Side-by-side photos (above) of an exhaust valve—used in the same industrial air compressor with only the lubricant changed—show how Pydraul keeps systems freer from harmful and dangerous deposits than a premium oil. Lower maintenance costs alone usually justify use of Pydraul.



PYDRAUL AC LUBRICATES like premium-grade oil—good anti-wear and noncorrosive features give equipment long life. And Pydraul is the one lubricant for virtually every compressor you own—has demonstrated excellent lubricating efficiency in hundreds of compressors of all sizes produced by all major manufacturers—gives trouble-free compressor operation for many years. Now, Pydraul is effectively lubricating compressors operating at over 4500 psi.—many operating continually with exhaust air temperatures of 340°F.

PHOTO COURTESY GRACE CHEMICAL CO. PYDRAUL—MONSANTO T. M. REG. U. S. PAT. OFF. DIV. OF W. R. GRACE & CO.



FIRESAFE PYDRAUL AC GIVES protection 2 ways in this danger zone—guards these three 4,000-hp. compressors. Petroleum oil residues deposit inside cylinders, valves, piping—glow hot and flake off—can unpredictably ignite flammable vapors from hot petroleum-based lubricants, causing fire... explosion! Monsanto's synthetic lubricant, Pydraul AC, essentially eliminates this basic cause of most compressor fires and explosions: It lessens carbon deposits and oxidation residues, and it is *fire-resistant.*

New, illustrated booklet gives more details, including how to make the easy conversion to Pydraul AC. Write, today. No salesman will call unless you so request.

Monsanto

FOR CONVENIENCE, USE QUICK REPLY COUPON

Monsanto Chemical Company
Organic Chemicals Division
Dept. CP-1, St. Louis 66, Mo.

Please send me the new 16-page booklet on fire-resistant Pydraul AC lubricant for air compressors.

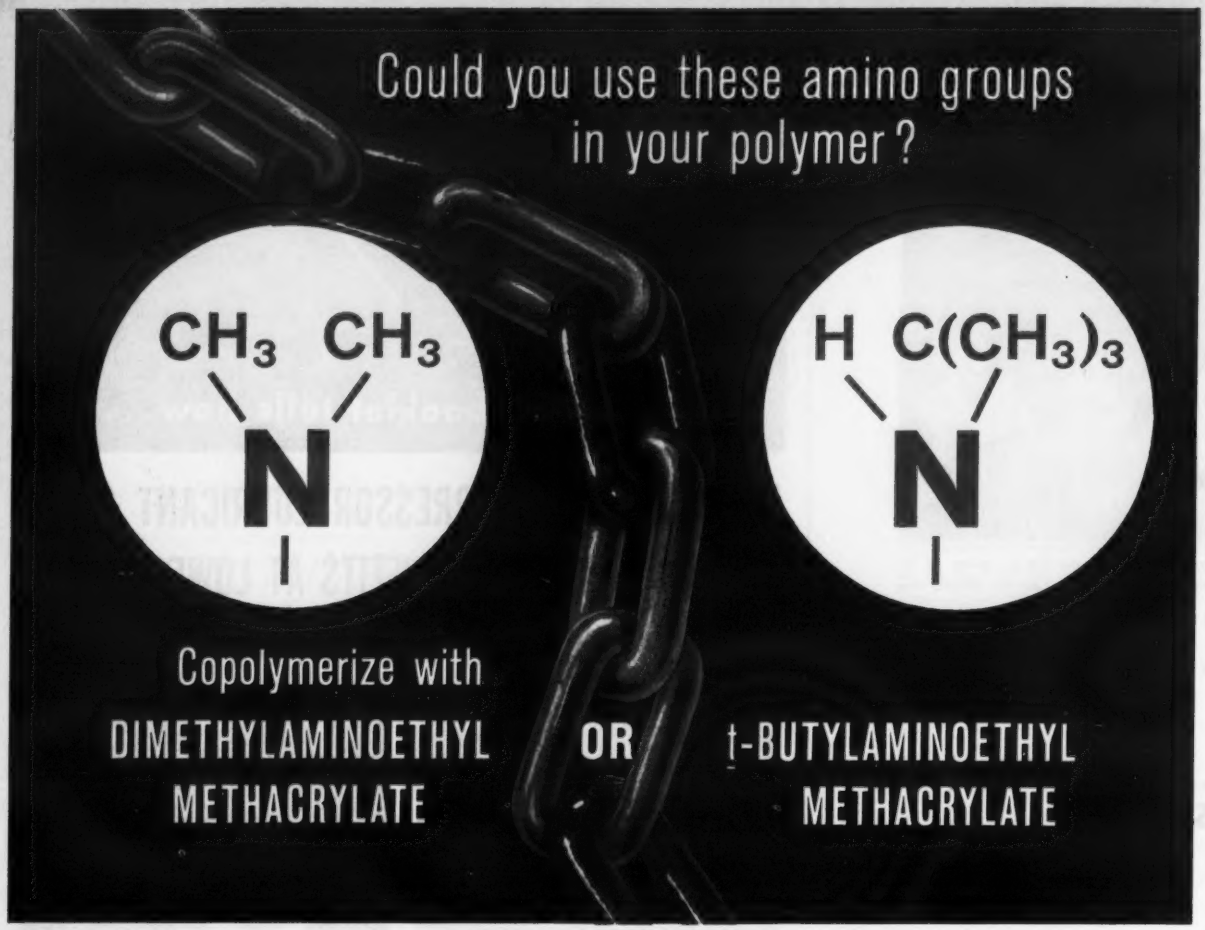
Name_____

Company_____

Address_____

City_____

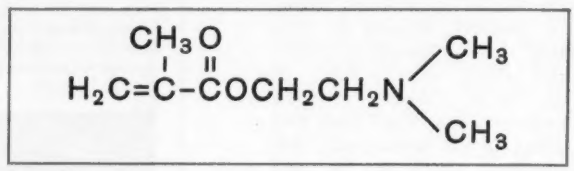
Check 1086 opposite last page

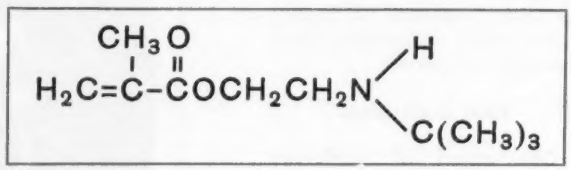


Do you need a copolymer with basic properties?—Copolymerization of Dimethylaminoethyl Methacrylate or *t*-Butylaminoethyl Methacrylate with monomers such as acrylonitrile, butadiene, acrylic or methacrylic esters, styrene, or vinyl acetate could solve your problem.

Vinyl polymerization and addition to the double bond are reactions common to both monomers. Dimethylaminoethyl Methacrylate is very soluble in water; it can be polymerized to a water-soluble cationic polymer, or copolymerized with acidic monomers such as methacrylic acid to give amphoteric polyelectrolytes. Copolymers of *t*-Butylaminoethyl Methacrylate exhibit good color characteristics. Individual reactions include: Dimethylaminoethyl Methacrylate—salt formation and quaternization; *t*-Butylaminoethyl Methacrylate—typical reactions of the amine group via the active hydrogen. Both monomers are soluble in all common organic solvents.

These monomers are suggested as intermediates for producing anchoring agents for dyes, pigments, waxes, oils, and moistureproofing compounds to various substrates . . . dispersing agents for nonaqueous systems . . . antistatic agents . . . stabilizers for chlorinated polymers . . . ion exchange resins . . . emulsifying agents . . . and cationic precipitating agents. Both monomers are available in development quantities. Samples and technical data can be secured by writing to Dept. SP-5.





Chemicals for Industry

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Check 1087 opposite last page

CHEMICAL MATERIALS

Epoxy-hardener threesome has low volatility, long pot life

Curing agent gives superior epoxy resins

Uses: For laminating compositions, potting, encapsulating, and impregnating electrical components. Also as curing agents in preparation of tools and dies and industrial baked coatings.

Features: Anhydrides have long pot life and low volatility.

Description: Dicarboxylic anhydride hardeners for epoxy resins impart longer pot life to resin mixtures, blend easily with both solid and liquid epoxy, and give low-peak exotherms and low-viscosity to room-temperature mixtures.

(Dodecenyl Succinic, Methyl Nadic (R), and Hexahydrophthalic are products of National Aniline Division, Allied Chemical, 40 Rector Street, New York 6, N.Y.)

Check 1088 opposite last page.

Difunctional acid now available commercially

Uses: As an intermediate for surface active agents, complex salts, and chelating agents.

Features: Material, which contains two reactive groups, is believed to be available in commercial quantities for the first time.

Description: Iminodiacetic acid is a white crystalline solid. Typical properties are: melting point (with decomposition), °C, 225; bulk density, gm/ml, 0.608; color, white.

(Iminodiacetic acid is available from The Dow Chemical Company, Midland, Mich.)

Check 1089 opposite last page.

Hydroquinone methyl ethers' physical and chemical properties, specifications, toxicity, and applications are outlined in 16-page catalog covering monomethyl and dimethyl ethers. Hydroquinone methyl ether catalog — Ansul Chemical Company, Marinette, Wisconsin.

Check 1090 opposite last page.

Low-molecular-weight PVP now produced commercially

Versatile as a dispersant, pigment protective colloid

Uses: As dispersant in detergent systems, pigment formulations, cosmetic applications. Shows indications of superior protective colloid action in suspension polymerization of polyvinyl chloride.

Features: Commercially available, the material is highly versatile, as evidenced by its high solubility in many organic solvents as well as water.

Description: Low-molecular-weight polyvinylpyrrolidone; average molecular weight: 10,000. In form of white powder.

Product offers most advantages in washing of synthetic fibers, including nylon, Dacron, and Orlon. It prevents color migration during laundering.

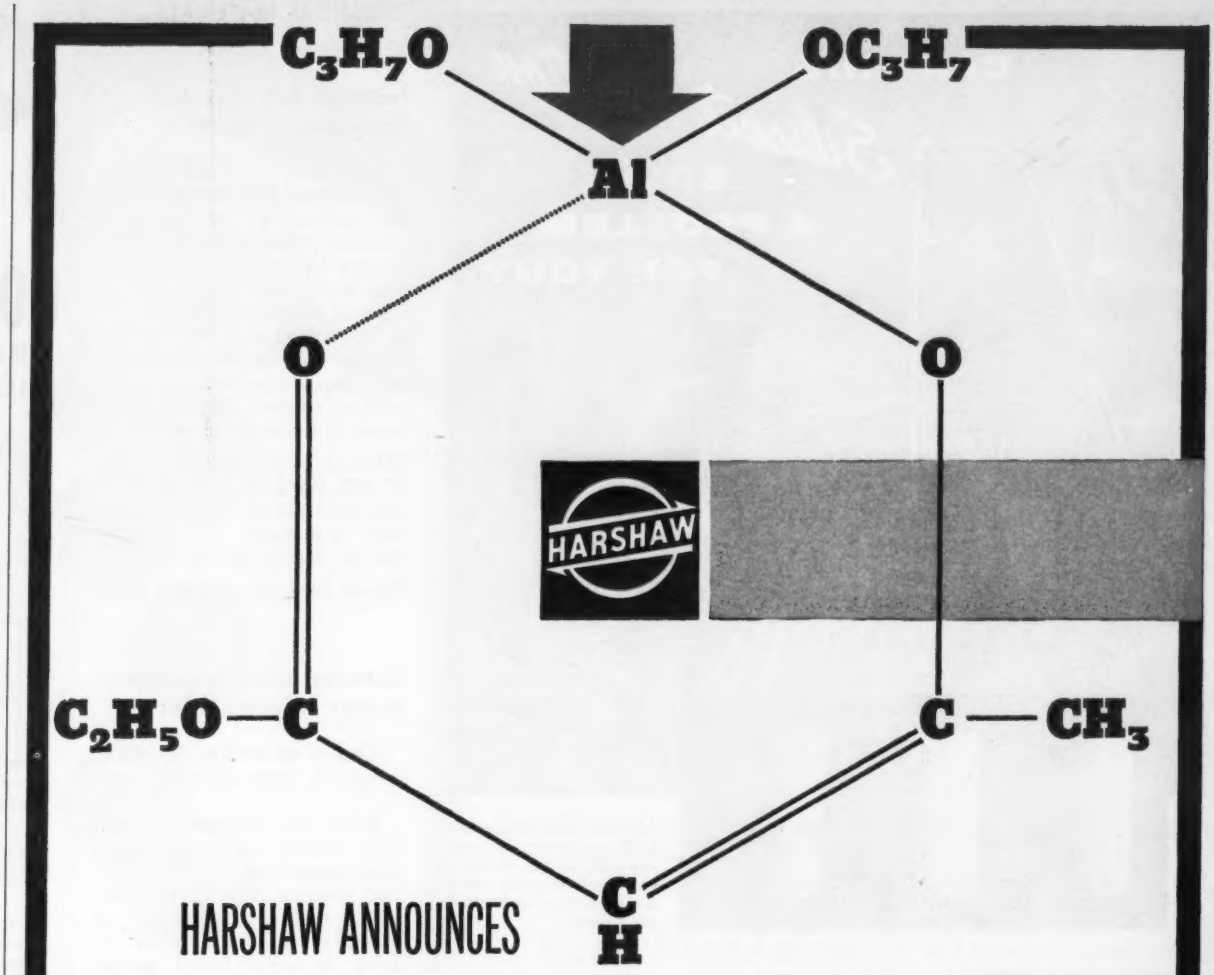
PVP helps achieve high tinctorial strength, dispersion stability, and excellent gloss, particularly in low-bulk-density pigments for paints, inks, and paper coatings. It also complexes with dyestuffs, suggesting use of dyes as paint-colorants to fill in gaps in the pigment color spectrum.

Material is suggested for use in hair tints, mascaras, lipsticks, liquid rouges, and color shampoos, where color uniformity, leveling action, and protective-colloid effects are important. Prevention of soil redeposition assured by PVP makes it useful in formulation of cleansing creams and shampoos.

(PVP K-15 is made by Antara Chemicals Division of General Aniline & Film Corp., 435 Hudson St., New York 14, N. Y.)

Check 1091 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



HARSHAW ANNOUNCES

aluminum chelate PEA-1

A NEW VERSATILE CHEMICAL WITH GREAT PROMISE

Uses already established for HARSHAW ALUMINUM CHELATE ARE:

1. Crosslinking Agent
2. Hydrophobic Intermediate
3. Drying Oil Modifying Agent
4. Adhesion Promoter

PROPERTIES

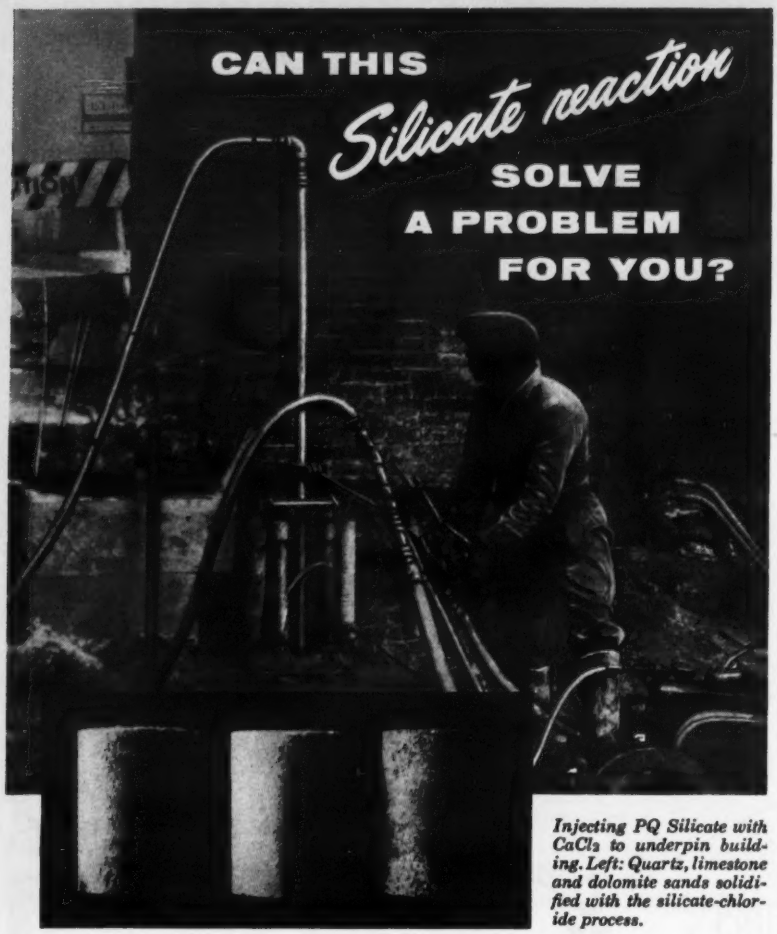
Formula Weight.....274-29
Color.....1-2 (Gardner Scale)
Viscosity... W-X (Gardner Scale)
Specific Gravity....1.035@25°C
Weight Per Gallon.....8.6

The Harshaw Chemical Co. is the first commercial producer of Aluminum Chelate in the United States.

We have prepared a Technical Data Sheet which describes the characteristics of Harshaw Aluminum Chelate PEA-1, and also discusses suggested applications. A copy of this can be obtained by contacting the New Products Department, The Harshaw Chemical Company, Cleveland 6, Ohio.

THE HARSHAW CHEMICAL CO.
1945 East 97th Street · Cleveland 6, Ohio
Chicago • Cincinnati • Cleveland • Detroit • Houston • Los Angeles • Philadelphia • Pittsburgh • Hastings-On-Hudson

Check 1092 opposite last page



Injecting PQ Silicate with $CaCl_2$ to underpin building. Left: Quartz, limestone and dolomite sands solidified with the silicate-chloride process.

"N" Sodium Silicate combined with calcium chloride solution yields a reaction product. Depending on concentrations, temperature and other conditions the result may be fine precipitates, hard gritty masses, or gels.

This chemical reaction between sodium silicate and calcium chloride has a number of interesting uses. The engineer's skill has devised methods for forcing the two chemicals into loose water-bearing sand and soil. Here the cementing action binds the sand grains into a solid mass with a crushing strength up to 57 tons per sq. ft. Other uses of the silicate chloride reaction include coatings and cements.

A PQ silicate (sodium or potassium) alone or by reaction with other chemicals may improve one of your products or processes. Ask to be placed on the mailing list of Silicate P's & Q's edited monthly for quick reference on silicate developments and research.

PHILADELPHIA QUARTZ COMPANY
1060 Public Ledger Building, Philadelphia 6, Pennsylvania

PQ SOLUBLE SILICATES

TRADEMARKS REG. U.S. PAT. OFF.

Associates: *Philadelphia Quartz Co. of Calif.; Berkeley & Los Angeles, Calif.; Tacoma, Wash.; National Silicates Limited, Toronto, Canada*

PQ PLANTS: ANDERSON, IND.; BALTIMORE, MD.; BUFFALO, N.Y.; CHESTER, PA.; JEFFERSONVILLE, IND.; KANSAS CITY, KANSAS; RAHWAY, N.J.; ST. LOUIS, MO.; UTICA, ILL.

Check 1093 opposite last page

Indicator trio expedite non-aqueous titration

High-purity, individually lot analyzed indicator solutions are used in non-aqueous titration. Methyl violet, 0.2% weight by volume, in monochlorobenzene (So-M-108) is used in titration of bases.

Thymol blue, 1.0%, in dimethyl formamide (So-T-92) and quinaldine red, 0.1%, in methyl alcohol (So-Q-1) are used in titration of acids.

(Dry titration indicators, So-M-108, So-T-92, and So-Q-1, are products of Fisher Scientific Company, 717 Forbes Street, Pittsburgh 19, Pa.)

Check 1094 opposite last page.

Colloidal-silica suspension in four different types

Choice of media, % silica, particle sizes offered

Uses: As additive or surface coating to impart nonskid properties to waxes, paper, plastics. Also for frictionizing and strengthening of glass, textile, and paper fibers. In water-based paints, material could be used to impart slip-resistance, as wetting and flatting agent, to retard aging and resist soil.

Other possible uses: surface preparation to improve bonding of cements, mortars, glass, metals; anti-blocking agent for plastics; reinforcing filter for synthetic rubber, and mold-release agent in rubber industry.

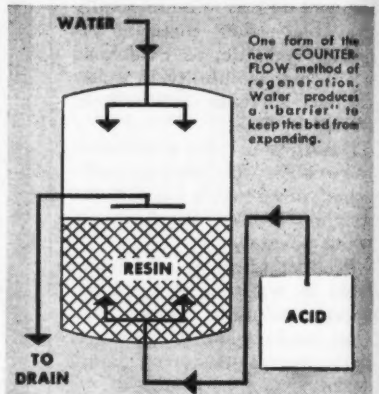
Features: After setting, coatings have same basic characteristics as silica: high thermal stability, good resistance to acids and solvents.

Description: Colloidal suspensions of spherical millimicron-size silica. Four different ones are available: Nalcoag 1015, 1030, 1035, and 1022. The first three are water suspensions containing, respectively, 15, 30, and 35% silica. Last is a 21% suspension in aqueous-alcohol medium, designed to give better wetting, spreading, and adsorption characteristics. It converts an oil-wet surface to

ILLCO-WAY ionXchange

COUNTERFLOW*

REGENERATION OF ION-EXCHANGERS


WATER
One form of the new COUNTERFLOW method of regeneration. Water produces a "barrier" to keep the bed from expanding.
RESIN
ACID
TO DRAIN

* "COUNTERFLOW" is the trade mark of Illinois Water Treatment Company equipment utilizing a distinctly new principle of regeneration. Pat. pending.

"COUNTERFLOW" is a method whereby upward regeneration, which has long been recognized as most desirable, is successfully accomplished by establishing a "barrier" at the resin face.

LOOK AT THESE

RESULTS!

- De-ionizer in a power plant. Conductivity of effluent improved from 10 micromhos to 4 micromhos after conversion to COUNTERFLOW. Cation leakage, expected at 4 ppm with downflow regeneration, actually is only 1 ppm.
- Chemical company in Middle West, 480 ppm TDS in raw water. Expected cation leakage with conventional regeneration, 9 ppm; with COUNTERFLOW, only 1.2 ppm.
- Distillery in Middle West. TDS in raw water, 575 ppm. Expected cation leakage with conventional equipment, 6 ppm; with COUNTERFLOW, is actually only 1.5 ppm.
- Western power plant, converted to COUNTERFLOW. Savings in acid reduction, $16,000.00 per year. TDS in raw water, 342 ppm. Predicted cation leakage from curves for conventional design equipment, 4 ppm; with COUNTERFLOW, actually only 1.6 ppm.

ILLCO-WAY

ILLINOIS WATER TREATMENT CO.
840 Cedar St.
Rockford, Ill.

NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Ont.

Check 1095 opposite last page

one that is completely water-wettable.

Silica particle size in first two suspensions is, respectively, 7-9 and 11-16 millimicrons. Particle size in last two is 16-22 millimicrons. pH of first and third is 8.6; of second, 10.2; of last, 3.7. Viscosity of the water suspensions is less than 5; of the aqueous-alcohol suspension, less than 10.

(Nalcoag colloidal-silica suspensions are made by National Aluminate Corporation, 6216 W. 66th Place, Chicago 38, Illinois.)

Check 1096 opposite last page.

Encapsulating resin fights moisture and flame

Uses: Encapsulating resin for electronic components that require high moisture resistance and flame retardance.

Features: Transformers encapsulated with the resin have passed severe humidity and flammability tests (Military Spec MIL-T-27A).

Description: Silicone-modified filled resin is said to provide greater reliability, with resultant savings in weight, space, and mold costs, compared with casting techniques.

(For more information on Fosterite SFR BT-3199 resin, write Micarta Division, Benolite Plant, Westinghouse Electric Corporation, Manor, Pa.)

Check 1097 opposite last page.

If you want to squeeze more value from your

FILTERAID or FILLER DOLLAR

...let your Dicalite man help!

He can be of greater help than first thoughts might indicate—because his technical knowledge and the products he represents go beyond even the wide range of Dicalite itself. Glance down this list for proof.

DICALITE FILTERAIDS. 10 standard grades of top-quality filteraids to handle most filtration problems, plus a score or more of special grades for particular applications.

NEROFIL FILTERAIDS. Several grades of a specially-processed carbon-based filteraid to give excellent clarity and fast flow-rates in "difficult" filtrations such as caustic and fluorated solutions.

DICALITE FILLERS & EXTENDERS. A host of diatomaceous materials to give special properties or to cut costs in a wide diversity of products ranging from paint and paper to insecticides and batteries.

NEROFIL FILLERS. Processed carbon-based filler materials with definite advantages in plastics production and in cements, as catalyst carriers, and in other applications.

HUNTLEY CLAYS & TALCS. High-brightness kaolins, low-lime talcs, low-pH pyrophyllites and other non-metallic minerals produced by Huntley Industrial Minerals, Inc.

Check the coupon and mail it today for further information.

DICALITE DEPARTMENT, 612 So. Flower St., Los Angeles 17, Calif.
Please send me further information on:

☐ DICALITE FILTERAIDS ☐ DICALITE FILLERS ☐ NEROFIL FILTERAIDS
☐ NEROFIL FILLERS ☐ HUNTLEY CLAYS & TALCS

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Suppliers to the industry

Tamms

...SUPPLIERS OF IMPORTANT SOAP INGREDIENTS OF UNIFORM GRADE AND TOP QUALITY

VOLCANIC ASH

SILICA (140 AND 200 MESH)

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SILICA SAND (30 TO 80 MESH)

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SAMPLES AND PRICES SENT ON REQUEST

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Check 1099 opposite last page

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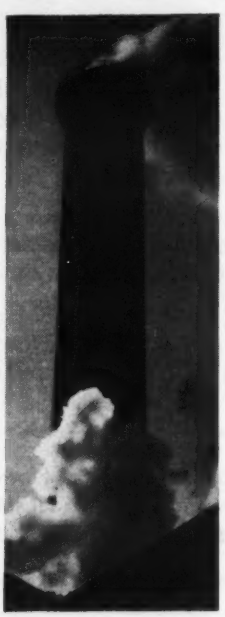
FREE BROCHURE TELLS YOU HOW

Now learn how you can clean up combustible pollutants, fumes and odors from your processes. An Oxy-Catalyst System can be engineered to your special requirements. Catalytic oxidation is the most effective air pollution control and waste heat recovery method ever developed! Installation often leads to actual fuel savings. Investigate! Send today for brochure, "Oxycat Systems" —packed with facts and figures on typical industrial installations. Mail coupon below.



OXYCAT

OXY-CATALYST, INC. Wayne 7, Pa., U.S.A.

Catalysts for fume and odor elimination, air pollution control and waste heat recovery

Send me free brochure, "Oxycat Systems"

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Firm_____

Street_____

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Check 1100 opposite last page

CHEMICAL MATERIALS

Impurities are scarce in chromium

Chromium, which contains no single metallic or gaseous impurity in quantities greater than 10 parts per million, has recently been developed. It is produced by means of decomposition process.

Greater degree of alloy fabricability can be achieved with new chromium than with any previously available. Higher chromium content in alloy is possible.

(Iochrome is a product of Chromalloy Corporation, 450 Tarrytown Road, White Plains, New York.)

Check 1101 opposite last page.

Organic peroxide concentrate deviates ± 1.0% of 72.0% concentration

Uses: As catalyst in emulsion polymerizations of vinyl monomers, polyesters, styrene, and methacrylates. Also for bleaching of oils, synthesis of organic compounds, and oxidation of petroleum hydrocarbons.

Features: Commercial quantities contain a minimum of 72.0% concentration with deviation of ±1.0%.

Description: Tertiary butyl hydroperoxide is one of a line of organic peroxides offered by Cadet Chemical Corporation.

(Detailed information about, and samples of, tertiary butyl hydroperoxide may be obtained from Chemical Department, McKesson & Robbins, 155 East 44th Street, New York 17, N.Y.)

Check 1102 opposite last page.

Surface-active agent reduces corrosion, produces foam

Bacteria in cooling water also controlled

Uses: Reduction of corrosion of steel in water systems, control of microörganisms, and production of stable foam. Product should be useful as a

Dawe's

a dependable source for

SODIUM GLUCONATE and GLUCONIC ACID

Promptly available in any quantity.

Warehouse stocks across the country.

Dawe's high quality is assured.

Write for technical data and samples.

Dawe's

DAWE'S LABORATORIES, INC.

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Complete Price $49.50 Including Cards

FREE 24-Page ILLUSTRATED BOOKLET AA-50 Without Obligation

GRAPHIC SYSTEMS, 55 West 42nd St., New York 36, N.Y.

Check 1104 opposite last page

detergent or industrial cleaner additive.

Features: Agent is soluble in water, benzene, hexylene, glycol, and carbon tetrachloride. Pour point is less than 0°F.

Description: Cationic-surface-active agent is 40% active isopropanol solution. Testing indicates that total growth inhibition in mixed culture of algae can be obtained with 0.01 to 0.02% of chemical.

(Surface-active-agent RD-2873-P is a product of Armour and Company, Chemical Division, 1355 West 31st Street, Chicago 9, Ill.)

Check 1105 opposite last page.

Offer quaternary-free grade of anhydrous TKED polyol

Uses: Suggested applications include chelating agent; humectant; absorbent for gases such as hydrogen sulfide and carbon dioxide; plasticizer; cross-linking agent; catalyst or catalyst modifier for urethane foams.

May also find use as an intermediate for resins, emulsifying agents, rubber chemicals, plasticizers, surface-active agents, pharmaceuticals, adhesives, corrosion inhibitors, agricultural chemicals.

Features: Quaternary-free.

Description: Anhydrous N,N,N′, N′-tetrakis (2-hydroxyethyl) ethylenediamine. Molecular weight is 236. Active hydrogen (equivalents per mole) runs 3.7 to 4.0%. Analyzes 11.5-11.85% nitrogen. Color (APHA) is 300 ppm max. pH of 10% solution is 11.

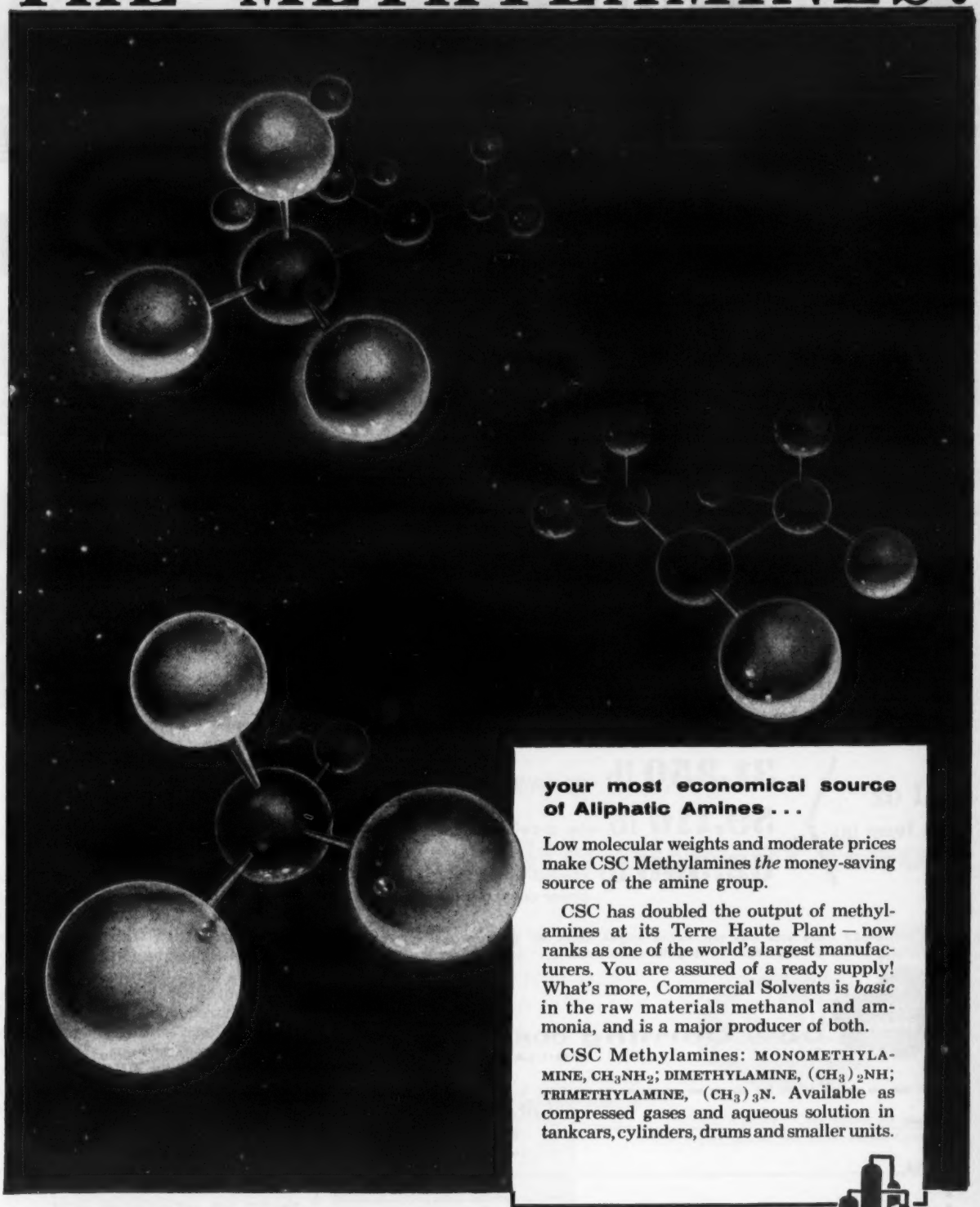
(TKED polyol is product of Arnold, Hoffman & Company, Inc., Providence, R. I.)

Check 1106 opposite last page.

Copolymerization of dimethylaminoethyl methacrylate or t-butylaminoethyl methacrylate with monomers such as acrylonitrile, butadiene, acrylic or methacrylic esters, styrene, or vinyl acetate is discussed in Copolymerization Technical Data — Dept. SP-5, Rohm & Haas Company, Washington Square, Philadelphia 5, Pa.

Check 1107 opposite last page.

THE METHYLAMINES!



your most economical source of Aliphatic Amines . . .

Low molecular weights and moderate prices make CSC Methylamines *the* money-saving source of the amine group.

CSC has doubled the output of methylamines at its Terre Haute Plant — now ranks as one of the world's largest manufacturers. You are assured of a ready supply! What's more, Commercial Solvents is *basic* in the raw materials methanol and ammonia, and is a major producer of both.

CSC Methylamines: MONOMETHYLAMINE, CH_3NH_2; DIMETHYLAMINE, $(CH_3)_2NH$; TRIMETHYLAMINE, $(CH_3)_3N$. Available as compressed gases and aqueous solution in tankcars, cylinders, drums and smaller units.

Industrial Chemicals Department

COMMERCIAL SOLVENTS CORPORATION

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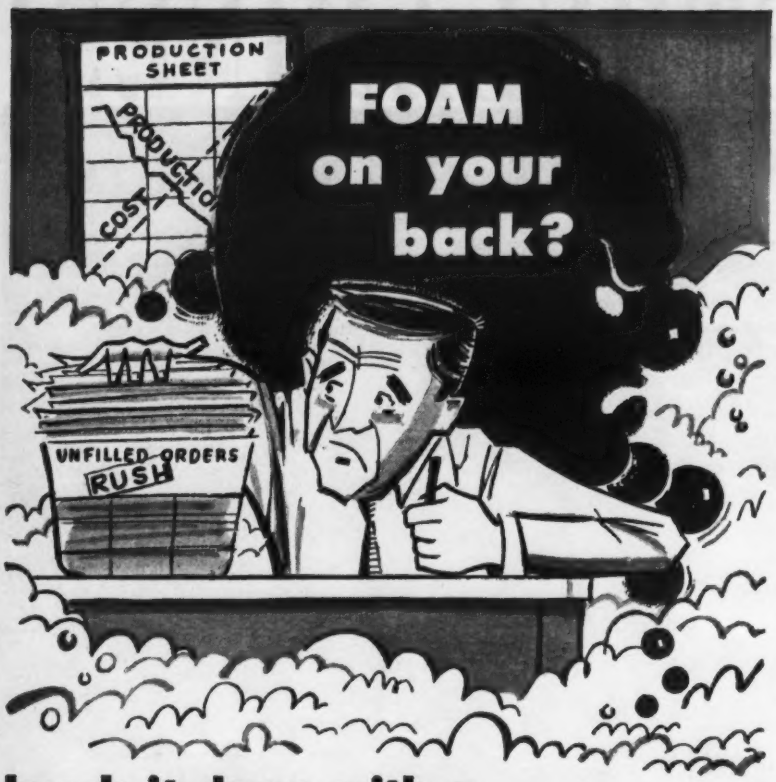
Check 1108 opposite last page



knock it down with a Dow Corning SILICONE DEFOAMER!

If *foam* has you down (and your processing too), try a Dow Corning SILICONE DEFOAMER. Get this costly menace off *your* back for good.

Here are examples of how these versatile foam killers have killed foam and increased capacity in different production processes.

1 oz kills foam in:

31,250 lb dog shampoo
59,110 lb wire drawing solution
62,500 lb alcohol-varnish paper coating solution

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first in silicones

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MIDLAND, MICHIGAN

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TITLE
COMPANY
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My foamer is
Oil system
Aqueous system
Food products
Other

Check 1109 opposite last page

Two plasticizers enhance low temp flexibility of vinyls

Third has low extraction and volatility

Plastolein 9213 Epoxy, Plastolein 9214 Epoxy are epoxidized fatty acid esters that contribute to low temperature flexibility of vinyls in addition to the heat and light stability for which epoxy plasticizers are recognized.

Plastolein 9232 Epoxy is a polymeric type typical of the highest quality currently available. It features very low extraction and volatility in addition to a high degree of heat and light stability.

(Plastolein 9213, 9214, 9232 are products of Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio.)

Check 1110 opposite last page.

Announce two vat dyes, phthalocyanine blue pigment

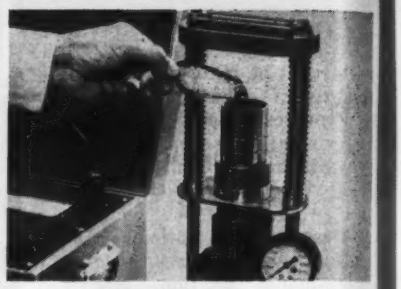
Neutral gray, violet dyes; green-shade pigment

Two new vat dyes and one green-shade phthalocyanine blue pigment have recently been introduced.

Calcoloid Gray 2BC Double Paste produces a neutral shade of gray in cottons and viscose rayons. Member of the anthraquinone class of vat dyes, the product combines high fastness and good level dyeing properties with excellent working properties all through the process. It has fine, controlled particle size for rapid reduction and fixation, is non-settling, non-specking, non-drying.

Calcoloid Violet BNC Double Paste is a bluish vat violet dye with excellent fastness to heat and moisture, even in lighter shades. Solid shades are stable to ironing, pleating, water-spotting. Even pale shades are very fast to light. It's advantageous in shading light blue or gray shades.

Cyan Blue GT 55-32 Pigment is intended for use in flexible vinyl plastics. Re-



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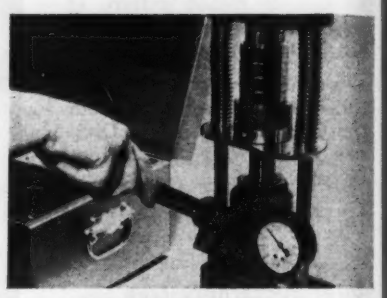

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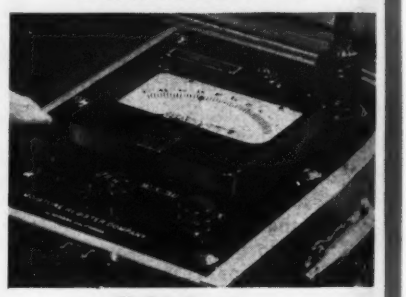

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G-5 Moisture Register for accurate moisture tests in 60 seconds

Fastest moisture test available with accuracy to 0%. Save production and lab time—no skilled labor needed. Use Electronic Moisture Register G-5 anywhere on granular, ground, loose, shredded and powdered materials. Hydraulic pressure assures homogeneous sample. Specially calibrated for ammonium nitrate, ammonium sulphate, toilet soaps, calcium carbonate, sulphur, ammonium perchlorate, sodium bicarbonate, polyethylene resins, many more. Accuracy guaranteed. *Ask for free trial.*

Write, stating material to be tested, and moisture range, or check No. 1111 on reader service card.

ELECTRONIC MOISTURE REGISTER *Instruments*

Moisture Register Co., Dept. CPC
P.O. Box 910, Alhambra, Calif.

Check 1111 opposite last page

ported to have excellent dispersability, superior strength development, and full-tone color intensity. Bright-green shade is maintained at high processing temperatures. Pigment is crystal-stable, does not bleed or migrate, is reported to have excellent acid and alkali stability, lightfastness, durability.

Weight per gal is 14.1 lb, bulking value is 0.071 gal/lb.

(All are developments of Pigments Division, American Cyanamid Company, 30 Rockefeller Plaza, New York 20, New York.)

Check 1112 opposite last page.

Chelating resin selective for heavy-metal cations

Separates ionic species that are closely related

Uses: Removing traces of heavy metals from wide range of product streams. Separating heavy metals.

Features: Now commercially available, chelating resin has very high selectivity for heavy-metal cations.

Description: Ion-exchange resin removes traces of iron, copper, or zinc from concentrated solutions of alkali and alkaline-earth metal salts. It will also remove alkaline-earth cations from concentrated solutions of alkali-metal cations.

Resin makes it possible to separate many closely related ionic species such as nickel from cobalt, copper from nickel.

It's easily regenerated by mineral acids.

(Dowex Chelating Resin A-1 was developed by The Dow Chemical Company, Midland, Michigan.)

Check 1113 opposite last page.

Soluble silicates of potassium and sodium are discussed in reference to application problems in monthly publication. Research and development progress in field is covered in "Silicate P's & Q's—Philadelphia Quartz Company, 1060 Public Ledger Building, Philadelphia 6, Pa.

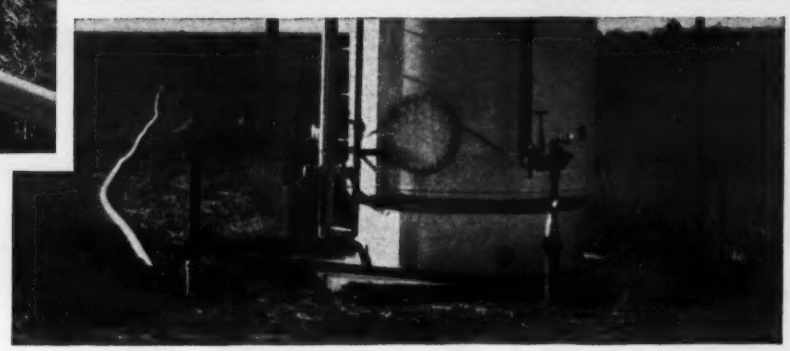
Check 1114 opposite last page.

News about

B.F.Goodrich Chemical *raw materials*

Geon pipe running to tank battery and water separator in distance is concealed by freshly covered-over trench. Geon pipe is being used for oil and gas lead lines up to 250 psi working pressures.

Three-inch Geon pipe leads through fitting made of Geon into 4-inch salt water disposal pipe, also made of Geon.



Three-inch Geon pipe carries salt water from a crude oil de-watering tower to a disposal well 1000 feet away. It will be buried after a second line feeding into the disposal line is installed.

Hundreds of wells per year show how to . . .

save with pipe of Geon

Pipe made from Geon rigid vinyl saves time and work—it is so lightweight and easy to install. And maintenance costs are considerably lower.

Pipe of Geon is immune to galvanic corrosion, is highly resistant both to salt water and sour crude oil. It stays smooth inside and out. And it provides high tensile or impact strength, standing up under pressure.

Engineers are taking advantage of the unique properties of Geon pipe for a wide variety of applications. For information on how you can cut costs by using pipe of Geon, write Dept. AL-2, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich

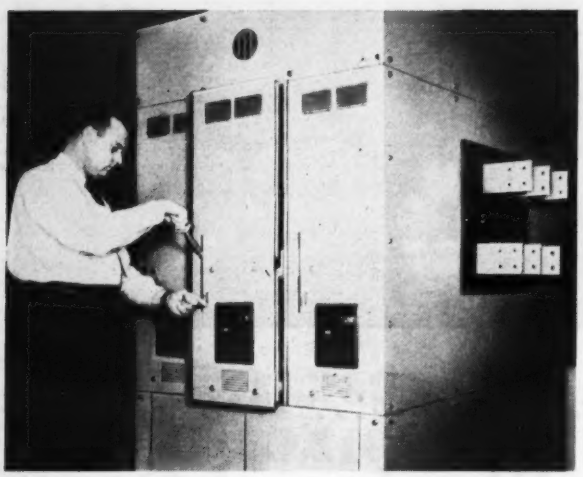
GEON polyvinyl materials • HYCAR rubber and latex
GOOD-RITE chemicals and plasticizers • HARMON colors

Check 1115 opposite last page

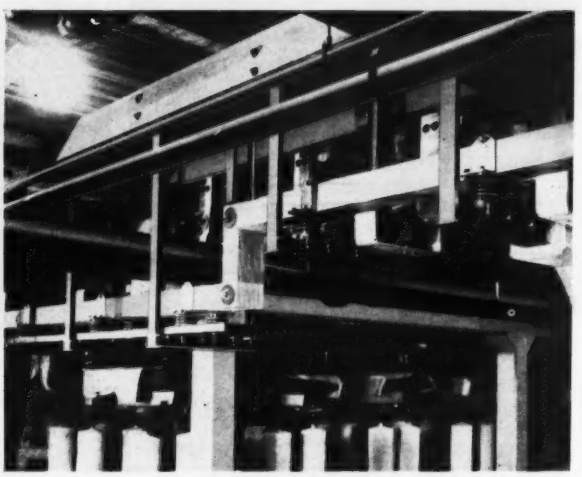
I-T-E CIRCUIT BREAKER COMPANY

D-C

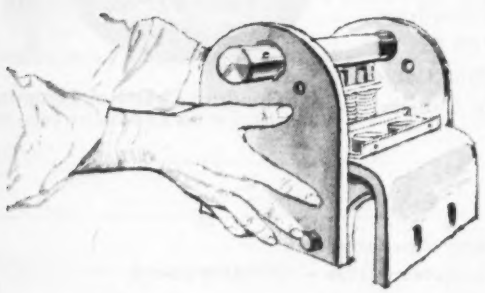
FOR ELECTROLYTIC PROCESSES



PROTECTION—Type FB anode circuit breakers from I-T-E limit arcback current to 60,000 amperes or less on large mercury arc rectifier systems. Novel arrangement of 6-pole breaker permits removal of single pole without interrupting service. You can replace a breaker in 3 minutes. Each pole is complete in itself. FB breakers can be equipped with reclosing controls for completely automatic protection of unattended stations.



CONDUCTION—I-T-E prefabricated bus comes to you completely engineered down to the last detail . . . including connectors, fittings and bus supports. Number, size and configuration of conductors are carefully specified by I-T-E engineers to insure desired conductivity, high strength, adequate thermal capacity, and low losses. Parts are formed, punched and marked to permit fast, accurate assembly. All joints are high pressure, with silver-to-silver contact.



CONTROL—Type CR electrolytic cell and bus switches pack enormous capacity into a much smaller space than conventional knife switches. Individual units are furnished in two sizes, 3000 and 6000 amperes, and are rated at up to 250 volts. They may be easily paralleled for any desired current capacity. Switch is designed so that contacts may be replaced without dismounting. Proved in service for years.

FREE LITERATURE . . . on these and any I-T-E equipment. Call your nearby I-T-E representative. Or write I-T-E Circuit Breaker Company, 1900 Hamilton St., Philadelphia 30, Pa.

Check 1116 opposite last page

Neoprene cements OK for higher temps

Heat-reactive phenolic resin component turns trick

Uses: Component in neoprene cements. Use improves adhesion to Dacron, nylon, rayon, glass, metals, and unplasticized plastic films. Also minimizes tendency of bonded fabrics to deteriorate in sunlight.

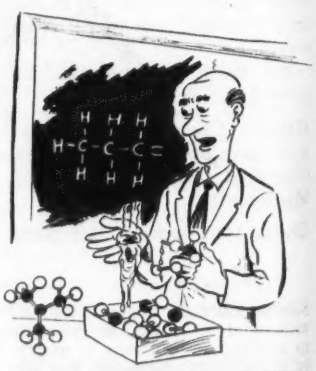
Features: Since it is heat-reactive, this phenolic resin (Durez 19428) permits cements to withstand higher temperatures than does manufacturer's Durez 12603. (Older, lower-price product will still be marketed for applications where it is still satisfactory.)

Description: New resin, supplied in crushed form, has clear melting point of 75°C, specific gravity of 1.10. It is stable when stored in closed containers in cool, dry place.

Resin has good compatibility with all neoprene types and is soluble in toluene, VM&P naphtha, methyl ethyl ketone, acetone, carbon tetrachloride, and mineral spirits.

(Durez 19428 is available in commercial quantities from Durez Plastics Division of Hooker Chemical Corporation, North Tonawanda, N. Y.)

Check 1117 opposite last page.

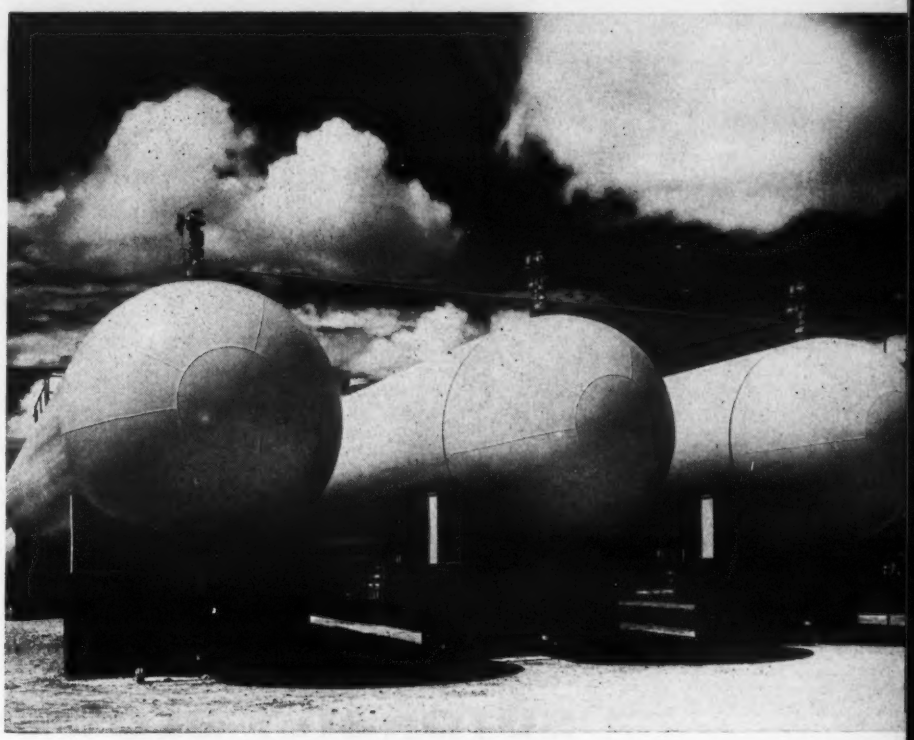


"All right!! Who slipped the egg in the model box!"

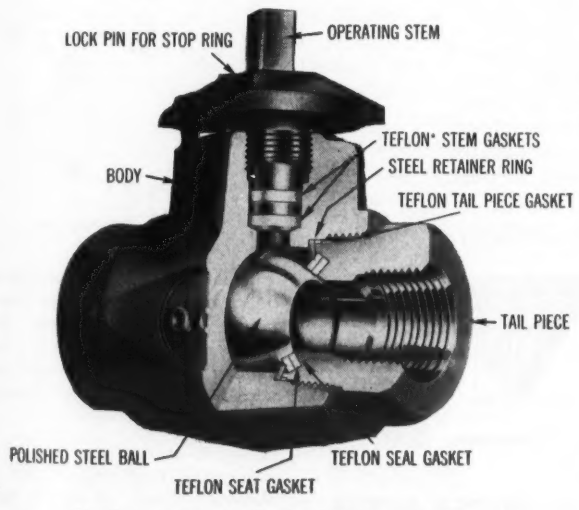
On the difficult application of handling propane at 20" Hg vacuum through 600 psi — about 150 ½ through 2" economical, maintenance-free, non-lubricated . . .

Double-sealed Ball Valves Have Never Leaked

GORDON WEYERMULLER, Petrochemical Editor
with **HOMER C. GIVENS,** Plant Superintendent
La Gloria Oil and Gas Company, Falfurrias, Texas



Ball valves in service on flare and gage lines of propane tanks at La Gloria Oil and Gas



Simple construction of valve minimizes maintenance

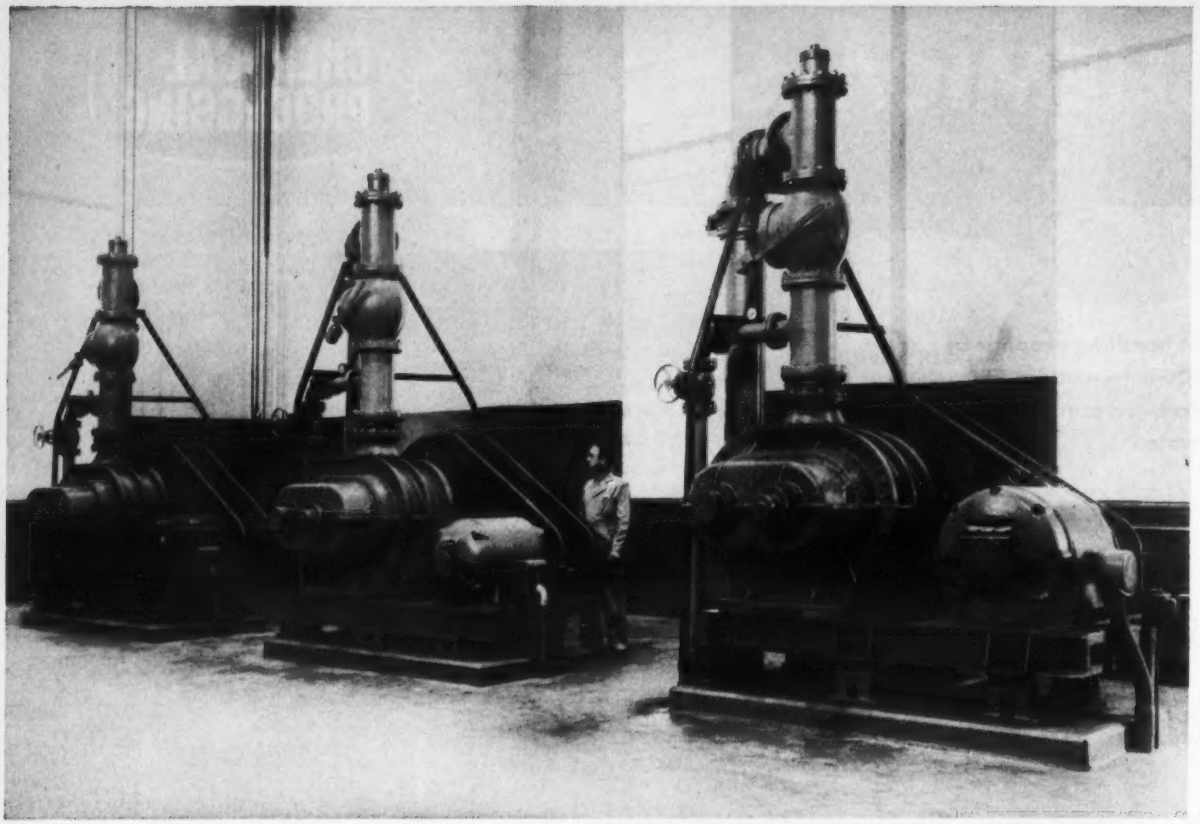
NON-LUBRICATED BALL VALVES — in which the ball is suspended between two Teflon seats — are giving outstanding service on propane at La Gloria Oil and Gas Company. Of the 150 being used, not one has leaked despite the nature of the material being handled.

Applications

In the plant at Falfurrias, some of the ball valves in use are on liquid propane dehydrators at a pressure of 275 psi and temperatures ranging from −10 to 225°F. They are also used on LP gas storage tanks, loading racks, and rundown lines. They work very well on gas, absorption oil, and casinghead gasoline lines and vessels. Ball valves from ½ through 2" in size are used in plant at pressures from 20" Hg vacuum through 600 psi.

One big advantage of the double-sealed ball valves is that the smaller sizes, from ½ through 1", can be tapped on the side and used in place of double-block, vented valve installations. Also, they are one of the most economical valves obtainable for use with nearly any chemical compound, either gas or liquid. Of course, pressure and temperature ratings must be observed.

These ball valves have always operated without sticking. No "cheaters" are ever needed to open or close. Plant has not had any maintenance on valves. Fact that valves are non-lubricated assures safety



These three 18 x 18 heavy duty Sutorbilt blowers operate at 350 rpm, deliver 2400 cfm against 7 psig . . . operate continuously for many, trouble-free years. San Jose Sewage Treatment Plant.

SUTORBILT BLOWERS MINIMIZE AIR CONTAMINATION

You can depend on Sutorbilt Positive-Pressure Blowers and Gas Pumps to deliver clean, dry air or gas for many years, without costly maintenance and loss in efficiency. Reasons include precision-machined, wide-face herringbone gears, extra-rugged exclusive Sutorbilt timing hub, heavy-duty anti-friction roller bearings . . . closely-held tolerances throughout. Grease and oil seals, or in some instances, a five ring packing gland, insure integrity of air seal where shaft passes through the blower headplate.

Write for illustrated brochure giving complete specifications.

Representatives located in principal cities. Consult your classified telephone directory.

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SUTORBILT CORPORATION, 2966 East Victoria St. • Compton, Calif.

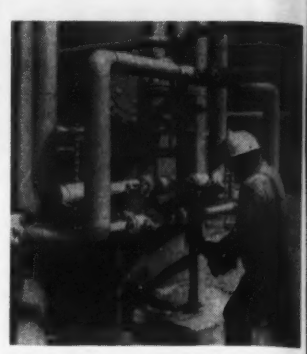
Subsidiary of Fuller Company, Catasauqua, Pa.

IS WELL BUILT

ROTARY POSITIVE-PRESSURE BLOWERS AND GAS PUMPS WITH VERTICAL OR HORIZONTAL MOUNTING

1164
5-11

Check 1118 opposite last page

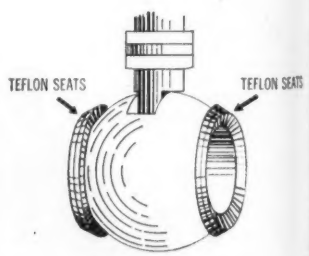


Liquid propane dehydrators use ball valves at pressures of 275 psi and temperatures ranging from −10 to 225°F

in handling propane and other products. Also, possibility of product contamination by lubricant is eliminated.

Valve Design

Ball is suspended between Teflon seats, under compression in assembly, assuring leakproof service under rated conditions. Actual seating and sealing surfaces are not subjected to abrasive action from flow of product. Full, round conduit through body and ball assure full flow through valve without restriction or turbulence. Friction loss is no greater than through an equivalent length of pipe.



Leakproof, two-way seal

Standard chrome-plated ball and Teflon trim resist most corrosives. With the quarter turn opening and closing of valve, seats are wiped clean of any foreign matter.

(Further information on non-lubricated ball valves can be obtained from W-K-M, div. of ACF Industries, Inc., P. O. Box 2117, Houston, Texas.)

Check 1119 opposite last page.

THAT'S INTERESTING

Glassware coating

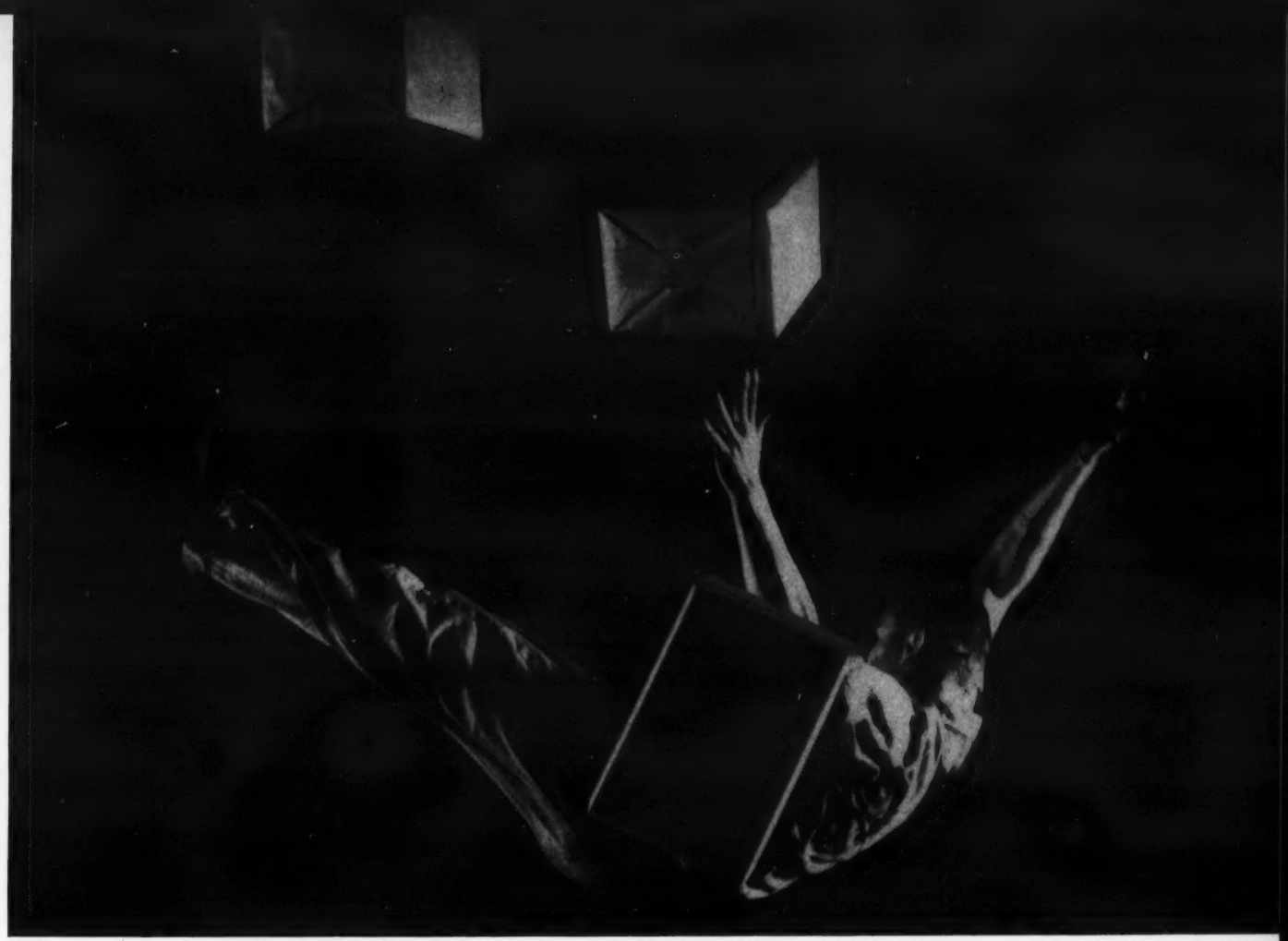
A persistent coating that gives better protection to glassware from annealing oven to consumer has been developed by Armstrong Cork Company. Called Armacote, coating is inert, invisible, and harmless. Spray is applied to outside of bottles as they leave annealing oven. It is recommended where lightweight glass and relatively high line speeds are involved.

Lightweights on rails

Aluminum refrigerator rail cars 22½% lighter than previous ones now are in service with the Canadian National Railways. Each of cars saves 14,200 lb of weight. It is hoped use of aluminum will eliminate high repair bills and frequent repainting.

Solution saves $$

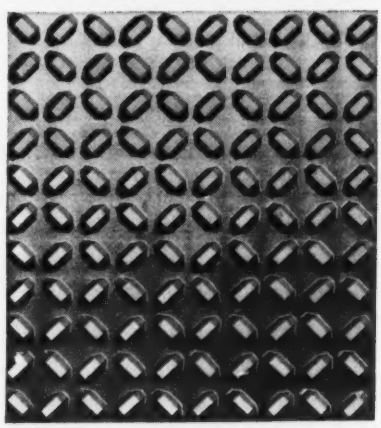
An American watch maker saves $300,000 annually by using an abrasive-bearing chemical solution in which parts are tumbled.



One slip can cost more than USS Multigrip

$100,000 for a single fall? Sounds fantastic, doesn't it? But there are actual cases involving suits for $100,000 or more for single falls. The average cost of injuries from slips and falls is lower than that, of course. In six states, during 1954, the cost per fall averaged close to $900.

You can eliminate many slips and falls by giving your workers a floor studded with cleats—USS Multigrip. This floor plate provides safe traction in any direction. The cleats are flat on top, easy to walk on—and do not catch the shoe.



For machine shops, loading platforms, cat-walks, and other dangerous locations, Multigrip supplies safety plus.

Where floors take a heavy beating from traffic, Multigrip will stand up for years under constant use. Oil and water won't soak in and can be easily removed from the surface with regular cleaning materials. You save money by having a floor that is easy to sweep or flush clean—and there's little or no maintenance.

On your next inspection trip, search out the danger spots—and make them safe with USS Multigrip.

USS is a registered trademark

Sold by leading distributors from coast to coast.

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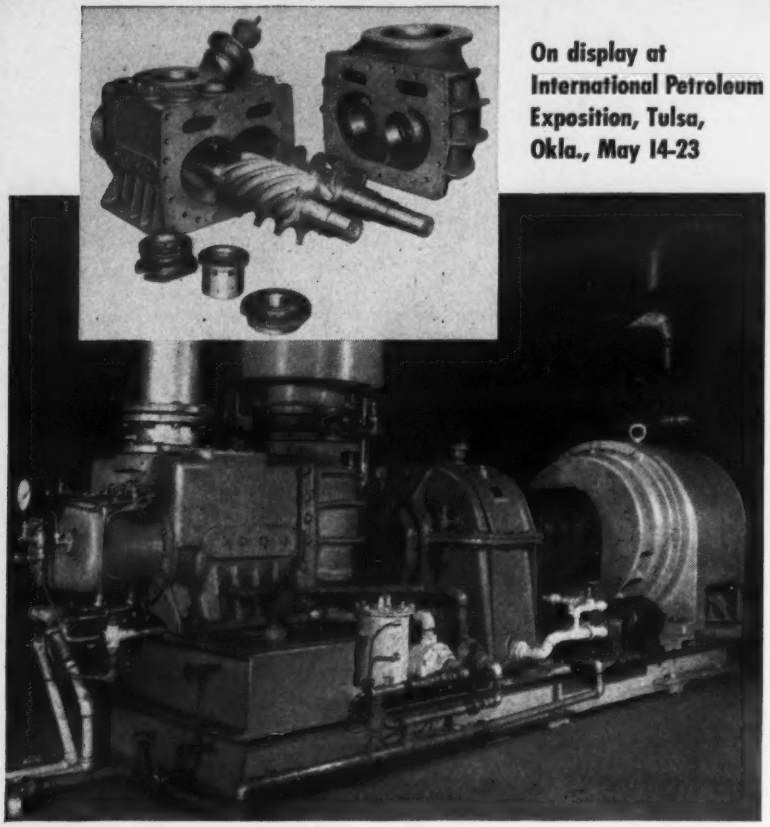
USS



On display at International Petroleum Exposition, Tulsa, Okla., May 14-23

NEW *Fairbanks-Morse Positive Displacement Axial-Flow...*

Oil-Free Rotary Compressor

for pressure, vacuum or booster service!

Here is a mechanically-simple, precision-built, high-efficiency compressor that combines the best features of reciprocating and centrifugal designs!

The new Fairbanks-Morse Axial-Flow Rotary Compressor is a two-impeller helical-lobe type machine ...ideal for a wide variety of applications...smooth in performance, adaptable to any power source. Unit weights and space requirements are impressively low.

Standard models are available in single-stage units with capacities from 800 to 12,500 cfm. at compression ratios from 1.6:1 to 5.0:1—or in two-stage units with capacities from 2,000 to 12,500 cfm. at compression ratios above 5.0:1—and for booster service at maximum working pressures up to 250 psig.

Contact your nearby Fairbanks-Morse Branch, or write Fairbanks, Morse & Co., 600 So. Michigan Ave., Chicago 5, Ill.

Ask for new Bulletin ACO 100.1.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

COMPRESSORS · PUMPS · SCALES · DIESEL, DUAL FUEL AND GAS ENGINES
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Check 1120 opposite last page

PETROCHEMICALS

Isobutylene family tree graphically shows present commercial uses of this versatile petrochemical. Also included are all reported reactions having new-product significance. Accompanying the 17 x 22" chart is a bibliography of 213 literature references, keyed to the chart so as to facilitate exploratory work of research men. "Isobutylene" — Petro-Tex Chemical Corporation, P. O. Box 2584, Houston 1, Texas.

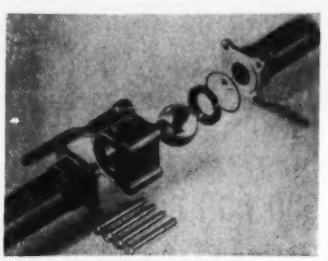
Check 1121 opposite last page.

Serves as valve, union, cuts installation time

Valves center easily removed

Uses: Units are said to make excellent roughing and forepressure valve controls.

Features: Serving as both valve and union, unit eliminates need for separate union and minimizes time spent in installation. Because of three-piece construction, valve center can be easily removed without disturbing union ends.



Straight-through ball valves for vacuum use eliminates need for separate union and cuts time spent in installation

Should repairs be necessary, either seating surface of O-rings may be replaced and valve center reinstalled in a matter of minutes.

Description: Vacuum straight-through ball valve is available in ½, ¾, 1, 1½, and 2-inch sizes. It may be installed either by NPT pipe connections or by sweat-soldering. However, the ¾-inch is only available in the sweat-soldering type.

Valve body is of cast bronze and ball valve is chrome-plated bronze. Buna-N gaskets and O-rings are used on both ends of the ballport, system connectors, and operator stem as-

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...and Packed With Important Benefits For You

At the 5th World Petroleum Congress Exposition, there will be more than 275 exhibits demonstrating the newest products and services for the petroleum and petrochemical industries. Plan now to attend with your key men. The visit will stimulate new approaches to many problems.

For advance registration and hotel information, write the Exposition at 480 Lexington Avenue, New York 17, N. Y.

1248

5th

WORLD PETROLEUM CONGRESS EXPOSITION

New York Coliseum

June 1-5, 1959

Management: International Exposition

Check 1122 opposite last page

sembly. Teflon gasket material is available.

Time-saving pneumatic air-cylinder for remote control is available for use with valves.

(VB valves are product of Rochester Division, Consolidated Electrodynamics Corp., 1775 Mount Read Boulevard, Rochester 3, N. Y.)

Check 1123 opposite last page.

Key parts interchangeable in medium-temperature centrifugal pumps

Water-cooling conversion is economical

Uses: Process pumping at temperatures up to 300°F and pressures to 600 psig, where water cooling of stuffing box and bearings is not required.

Features: Pumps have high degree of interchangeability of key parts. All parts are completely interchangeable with those of companion line of water-cooled units. Pumps can be easily converted to water-cooled type.

Description: Heavy-duty, medium-temperature process pumps, Class SFLM, are vertically split, single-stage single-suction units with overhung impellers. Capacities range up to 1400 gpm, heads to 650′. Discharge diameters are available in sizes of 1 to 4 inches.

(SFLM medium-temperature process pumps are product of Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.)

Check 1124 opposite last page.

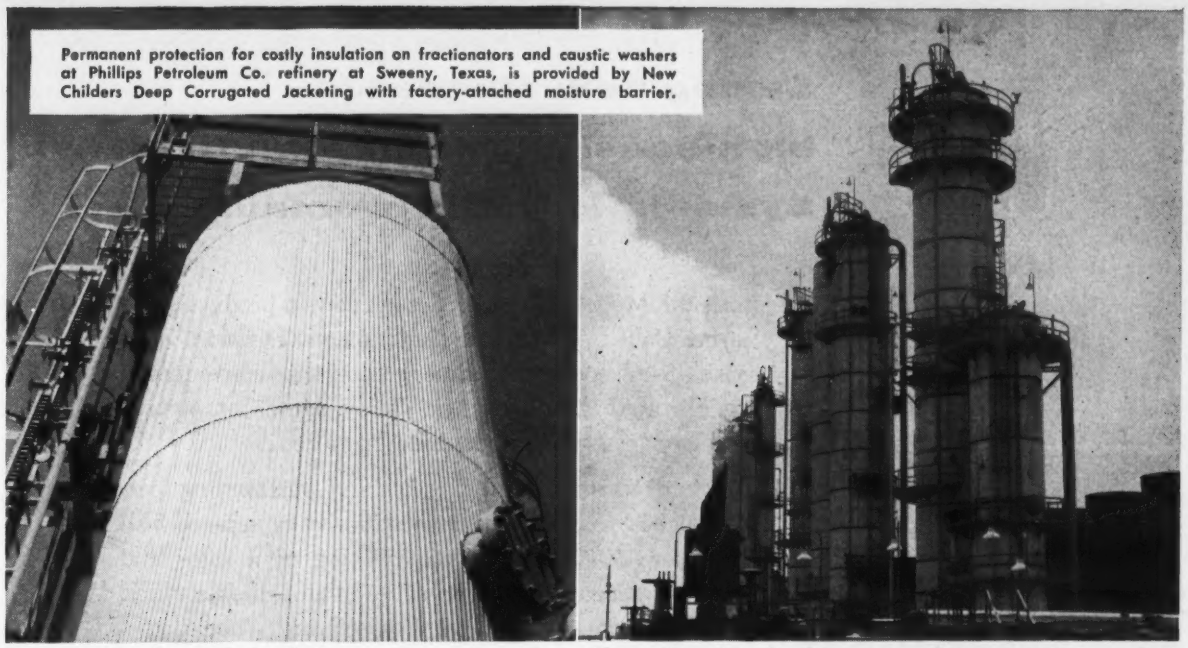
Heat-exchanger cleaning with high-pressure jetting tool is outlined in High-pressure Jetting Tool Cat — Dowell Division, The Dow Chemical Company, PO Box 536, Tulsa, Oklahoma.

Check 1125 opposite last page.

NEXT MONTH

Feature article will tell how a petrochemical company is saving a substantial sum of money through storage of ammonia at atmospheric pressure.

Permanent protection for costly insulation on fractionators and caustic washers at Phillips Petroleum Co. refinery at Sweeny, Texas, is provided by New Childers Deep Corrugated Jacketing with factory-attached moisture barrier.



Protection for the costly insulation on this caustic washer was applied in one easy operation because Childers Jacketing has factory-attached moisture barrier.

These gleaming aluminum-covered towers will always look new! No need to paint Childers Jacketing . . . a savings that alone may pay full cost of jacketing *plus* installation!

Why 724 plants specified this . . .

New Kind of Protection for Towers, Vessels & Tanks ...Childers Deep Corrugated Aluminum Jacketing:

Read why exclusive benefits of factory-attached moisture barrier are fast making Childers Jacketing the standard of the industry.

Only Childers gives you this special feature: Factory-Attached Moisture Barrier that (1) eliminates any danger of harm to the underneath side of the jacketing. And, (2) saves you time, labor and money because you apply jacketing with moisture barrier already attached . . . in one single operation.

You also get greater strength and greater protection at less cost with Childers Cross-Crimp®. Tests prove the rolled-in 3/16″ cross corrugation increases the vertical strength and rigidity of .019″ thick aluminum to that of plain .032″ thick aluminum. Jacketing costs are consequently reduced as much as ⅓ when Childers Jacketing is used instead of ordinary sheet aluminum.

It's easy to install Childers Deep Corrugated Jacketing. Jacketing is applied with sheet metal screws used on both the vertical and circumferential lap. Screws may be omitted from circumferential lap when necessary to provide expansion joints.

Comes in two corrugations: 1¼″ and 2½″; and four thicknesses: .016″, .019″, .020″ and .024″. The .019″ and .024″ thicknesses are made from roofing alloy for maximum life—recommended for normal jacketing of towers, vessels, and tanks. The .016″ and .020″ thicknesses are available in #3003-H-14 alloy.

For a free sample of Childers Deep Corrugated Aluminum Jacketing with factory-attached moisture barrier, plus engineering data on how to safeguard your insulation, write to Childers Manufacturing Company, Dept. CP-19, P.O. Box 7467, Houston 8, Texas.

In Canada, write direct to Peerless Mfg. Co., Sub-Post Office 28, Calgary, Alberta.

For insulated lines Childers Aluminum Weather-Proof Jacketing in rolls goes on about 30% faster than ordinary weatherproofing, fits perfectly, never needs painting. Used with Childers exclusive 90° and 45° Ell-Jacs, this modern aluminum protection gives your insulated lines that well-dressed look from end to end.

Only Childers makes available to you complete specifications and engineering data on aluminum jacketing in these catalogs: Refinery Catalog pp. 317-320; Sweet's Industrial Construction File pp. 10b/Ch; Chemical Engineering Catalog pp. 1011-1014.

Check 1126 opposite last page

THE MARK OF QUALITY

BARBER COLMAN

Wheelco Instruments

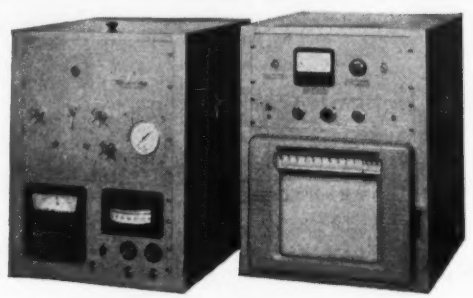
Setting new standards— high-sensitivity Ionization Detection Systems for gas chromatography

Both the Model 10 and Model 20, now in production at Barber-Colman's Wheelco Instruments Division, offer sensitivities thousands of times greater than conventional gas chromatography units. They come completely packaged, ready for immediate operation.

You can be sure of always getting outstanding performance because of Wheelco's extensive experience with ionization detectors and the backing of a sales and service organization with branches in all principal cities. Below are some advantages of specifying Wheelco:

MODEL 10 provides single or dual operation, offers electronic integrator and automatic readout as optional equipment.

MODEL 20 is a compact, portable unit using capillary columns developed for both laboratory and industrial use. Integrator can be provided.



1. Column temperatures are precisely maintained to ± .2° C over a range of 25° C to 300° C without relays. Individual temperature control is provided for sample injection, column, and cell.
2. Dual-sensitivity controls are provided by 7 ranges of electrometer sensitivity plus continuously variable 0-2000 volt d-c power supply.
3. Flexibility and versatility for a broad range of applications are assured because you can select from glass columns up to 10 ft long, ¼-in. metal columns up to 20 ft long, or capillary columns up to 250 ft long for use with the Model 10. Either capillary columns up to 2000 ft long or ¼-in. metal columns up to 100 ft long are handled on the Model 20.
4. Modular, unitized construction makes principal components readily accessible, facilitates modifications and adaptations.
5. Outstanding performance is assured because:
   (a) size of sample can be reduced for maximum efficiency with conventional columns.
   (b) on capillary columns the advance design detector approaches sensitivities of 10^{-15} moles; has been used to obtain efficiencies of over 200,000 theoretical plates.
   (c) specialized detector arrangement makes it possible to identify classes of compounds whether in a mixture or by themselves.

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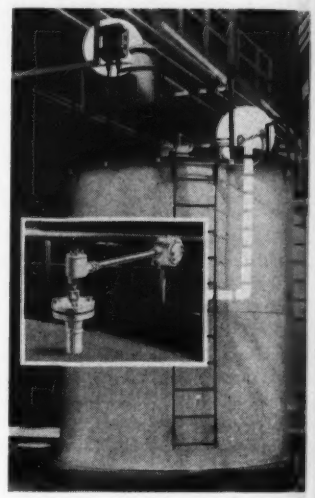
Industrial Instruments • Automatic Controls • Air Distribution Products • Aircraft Controls • Electrical Components
Small Motors • Overdoors and Operators • Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

Check 1127 opposite last page

Level indication system serves as sentry at latex plant

Monitors copolymerization of rubber ingredients

Capacitance measurement and control system is employed as continuous-process monitor of copolymerization of basic synthetic rubber ingredients (butadiene and styrene) at Shell Chemical Corporation latex plant in Torrance, Calif.



Continuous level indicating system monitors copolymerization of butadiene and styrene

Instruments are used as level indicators on flash tanks in critical blending process area. Second system detects level increase of foam caused by unreacted ingredients.

As foam reaches danger point, associated measurement unit signals this condition and trips alarm in master control area. Continuous visual display is provided in control area by an indicator unit.

Low-energy radio-frequency signal is used as bridge signal. Electrode detects level change as change in probe capacitance, resulting from difference between dielectric constants of vapor phase (about 1) and liquid phase (about 80). Signal reflecting capacitance unbalance is fed to indicator unit.

Insulated electrode extends from top to bottom of tank. Unit is available for pressures

up to 1000 psi at temperatures up to 350°C. Armored cable connects electrode to measurement unit which houses bridge. Standard power is 115v, 60 cy.

(Capacitance measurement and control system is a development of Aeronautical and Instrument Division, Robertshaw-Fulton Controls Company, 401 N. Manchester, Anaheim, Calif.)

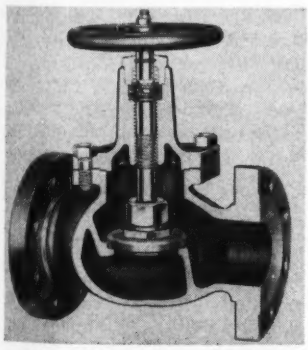
Check 1128 opposite last page.

Teflon seat discs, seals provide positive shutoff in globe, angle valves

Uses: For petrochemical and chemical applications involving numerous liquids and gases.

Features: Unit has Teflon seat discs and pressure seals. O-ring wiper keeps dirt, sand, and grit away from pressure seal and stem threads. Teflon V-ring pressure seal provides leak-proof operation. There is no packing to adjust or replace.

Description: Globe and angle valves are available in screwed or flanged types. Valves are available from ¾ to 3″ in size.



Teflon and ductile iron construction provide versatility in series of glove and angle valves

Temperature range is to 160°F and working pressures are 400 psig WOG for valves up to 2″ size, and 200 psig WOG for valves of 2½ and 3″.

(Series TA valves are product of The Bastian-Blessing Co., 4201 W. Peterson Ave., Chicago 46, Illinois.)

Check 1129 opposite last page.

These 46 Sola-Flex® distributors can serve you anywhere... faster!

WHEREVER YOU ARE LOCATED in the United States there is a dependable Sola-Flex representative nearby—ready to give immediate service and technical assistance on your expansion joint needs. This prompt, efficient service is but one of the many reasons why forty of America's fifty largest businesses rely on Sola-Flex expansion joints to help solve difficult piping problems. (Another reason is the outstanding Sola-Flex record of performance and reliability.)

Solar manufactures the most comprehensive line of expansion joints in the world. They are made from a wide variety of stainless and high-temperature alloys in a complete range of sizes from ½ in. to 35 ft in diameter. Temperatures range from −320F to 1200F, pressures from full vacuum to 600 psi and up. *And rugged Sola-Flex expansion joints can be "in service" one to four weeks after receipt of order.*

A new pamphlet describes Solar's complete line of Sola-Flex expansion joints. Write for it to Dept. F-135, Solar Aircraft Company, San Diego 12, California.

SOLAR AIRCRAFT COMPANY — SAN DIEGO, DES MOINES

ENGINEERS WANTED! Challenging projects, unlimited opportunities with Solar. Write today!

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BOSTON, MASS.—T. F. Fitzgerald 201 Devonshire Street
BUFFALO, N.Y.—Bass Industrial Equipment Co. 6045 Main Street
CHARLOTTE, N.C.—Mechanical Equipment Co. P. O. Box 4066
CHICAGO, ILL.—Piepenbrink & Schoonhoven 53 W. Jackson Blvd.
CINCINNATI, OHIO—Albert A. Azar & Associates 1987 Connecticut Avenue
CLEVELAND, OHIO—F. F. Eiseman 627 Hanna Building
CORAL GABLES, FLA.—Pan Amer. Western Co., Inc. 2103 Le Jeune Road
DALLAS, TEXAS—Power Specialty Co. 4512 N. Central Expressway
DAVENPORT, IOWA—DECO Engineering 320 Western Avenue
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DETROIT, MICH.—A. J. Blecki & 408 Donovan Building
EL PASO, TEXAS—George S. Thomson Co. 611 N. Campbell Street
GREENSBORO, N.C.—Mechanical Equipment Co. P. O. Box 965
GREENVILLE, S. C.—Mechanical Equipment Co. P. O. Box 1571
HOUSTON, TEXAS—Power Specialty Co. P. O. Box 6365—2000 Kipling
KANSAS CITY, MO.—Condit Co. 638 W. 39th Street
LOS ANGELES, CALIF.—Southport Engineering Co. 235 W. 32nd Street
MEMPHIS, TENN.—T. J. O'Brien Engineering Co. 668 S. Main Street
MINNEAPOLIS, MINN.—Arthur B. Anderson 3336 Hennepin Avenue
NEW ORLEANS, LA.—Power Specialty Co. 5534 Canal Boulevard
NEW YORK, N.Y.—Energy Control Co., Inc. 5 Beekman Street
NORTH HAVEN, CONN.—Energy Control Co., Inc. 31 State Street
OMAHA, NEB.—DECO Engineering 716 S. 24th Street
PHILADELPHIA, PA.—Energy Control Corp. 3147 N. Broad Street
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PORTLAND, ORE.—R. H. Brown Co. 5825 N. W. Front Avenue
RICHMOND, VA.—H. M. Summerell Co. Suite 105 Seaboard Building
ROSELLE PARK, N.J.—Energy Control Co., Inc. 472 E. Westfield Avenue
SALT LAKE CITY, UTAH—Pace-Turpin & Co. 726 South Third West
SAN FRANCISCO, CALIF.—Trident Engineering Co. 16 Beale Street
ST. LOUIS, MO.—O'Brien Equipment Co. 2832 Olive Street
TULSA, OKLA.—Condit Co. 1011 S. Main Street
WASHINGTON, GA.—Control Equipment Co., Inc. P. O. Box 565
WILMINGTON, DEL.—Energy Control Corp. 900-A W. 8th Street
BUENOS AIRES, ARGENTINA—Manuel A. Munoz Migueletes 1074
EDMONTON, ALBERTA, CANADA—Alberta Valve Specialties, Inc. 8035 102nd Street
HONOLULU, T.H.—Durant-Irvine Co., Ltd. 450 Piikoi Parkway
TOKYO, JAPAN—Nissho-Co., Ltd. Tokyo Boeki Kaikan Bldg. 2, 1-Chome, Otemachi Chiyoda-ku
TORONTO, ONTARIO, CANADA—Bass Industrial Equipment Co., Ltd. 214 Merton Street
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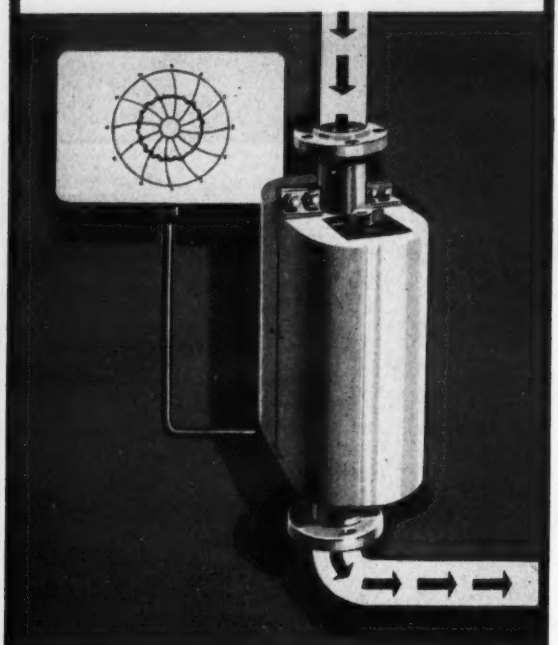
Check 1130 opposite last page

CURTISS-WRIGHT

DENSITY GAUGE

An "on-the-line" density check for liquids and free-flowing solids that speeds production, cuts costs



Now you can *know* that your product is up to standard concentration—can for can, bottle for bottle, package for package. The Curtiss-Wright Density Gauge, mounted on pipes or other carriers from ½" to 36" in diameter, provides continuous reading and recording of the density of any free-flowing material.

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Either of the two designs—one for light, another for heavy industry—may be located remotely. Advanced Curtiss-Wright engineering provides long-term reliability—minimum maintenance.

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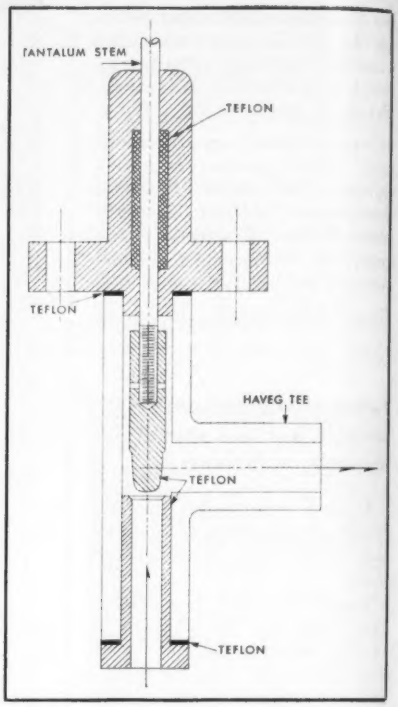


Cross section of tantalum-stemmed valves used in USI's HCl process

Tantalum 'takes it' in petrochemical plant

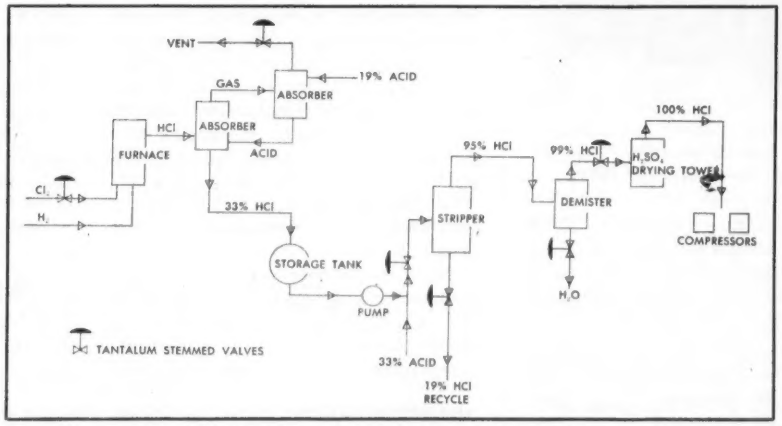
Hydrochloric acid varying in concentration from 33 to 99% at temperatures to 250°F has been withstood for seven years without corrosion of tantalum valve stems

The Tuscola, Illinois, plant of U. S. Industrial Chemicals Co., div. of National Distillers and Chemical Corporation has had excellent results with tantalum in HCl service. Six automatic flow control valves with tantalum stems have not corroded despite seven years exposure to HCl under a variety of conditions.

USI produces HCl by burning hydrogen with chlorine in a furnace. Chlorine flow entering furnace is controlled by a tantalum-stemmed automatic flow control valve.

Two absorbers are used to route the gas through weak hydrochloric acid to bring it to 33% strength. A second valve is located between second absorber and its vent. After storage, the 33% acid is supplemented with purchased acid of same strength. Acid flow at this point is controlled by a third tantalum-stemmed automatic flow control valve which operates under a maximum pressure of 100 psi at temperatures to 250°F.

With acid flow controlled, it enters a stripper which channels anhydrous 95% strength HCl to a demister. Acid of 19% strength leaves bottom of stripper



Flow diagram of USI's HCl process, showing where tantalum-stemmed valves are used

through a fourth tantalum-stemmed automatic flow control valve and is recycled to the absorbers.

Fifth tantalum-stemmed valve at bottom of demister automatically controls the unit's flow of acidified water. Sixth valve controls the flow of HCl to the drying tower.

Upon leaving the demister, the HCl now at 99% strength and containing less than 1% water, is percolated through H_2SO_4, resulting in perfectly dry 100% strength hydrogen chloride gas. Upon being compressed, it is ready for the ethyl chloride process.

Tantalum-stemmed automatic flow control valves were designed and manufactured by the USI Instrument Department at Tuscola.

(For further information on tantalum contact Fansteel Metallurgical Corporation, North Chicago, Ill.)

Check 1132 opposite last page.

Petrochemical complex valued at $50 million planned for Australia

A huge petrochemical project scheduled to be built near Melbourne, Australia will consist of plants for producing styrene, polystyrene, polyethylene, and GRS synthetic rubber. Construction will start shortly, with plants expected to go on stream in mid-1961.

A new company, CSR-Dow Pty. Limited, will manufacture the styrene. A portion of styrene will be used to make synthetic rubber and part for polystyrene. Ethylene for styrene monomer will come from a Standard Vacuum Oil Company plant. Ethylene will also be furnished to a Union Carbide plant, which will make polyethylene.

Gas-turbine driver application in refining industry is discussed from economic viewpoint in eight-page bulletin which incorporates performance charts on fuel consumption, exhaust-gas flow, and heat recovery. Bul 166 — Clark Bros. Co., one of the Dresser Industries, Olean, N.Y.

Check 1133 opposite last page.

How to get a safer, clearer look inside at 500°F.

This peephole is giving you a look at what happens at 500°F.—through a PYREX brand Sight Glass. Even at high temperatures, you get a safer look, a *clear* look—because it's a *special* glass.

Glass that can stand up to abrasion, thermal or mechanical shock. Glass that can stand pressures up to 300 p.s.i. Glass that resists clouding and pitting from corrosives. Glass that stays transparent for a long service life.

You can use PYREX brand Sight Glasses to see into ovens, absorption columns, reaction kettles, furnaces, pressure vessels, evaporators, stills, or processing tanks. They're available in a range of sizes for all applications.

Ask your regular industrial supply dealer for more information—or write us for your copy of Bulletin EB-20. It gives complete specifications of PYREX brand Sight Glasses with mounting recommendations. Corning Glass Works, 15 Crystal Street, Corning, N. Y.

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CORNING MEANS RESEARCH IN GLASS

Check 1134 opposite last page

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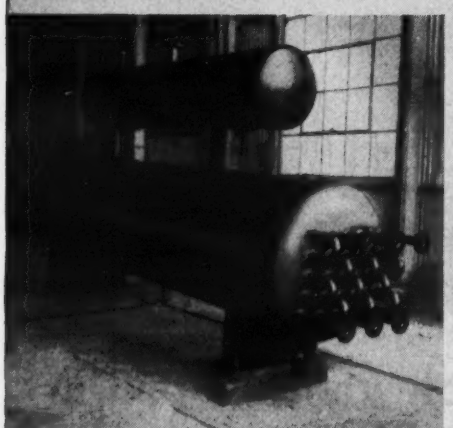
Modern Welding Company offers a wealth of experience in plate fabrication. Five well equipped Modern Welding Plants are strategically located to serve the Chemical Processing and Petroleum Industries. All plants are equipped to handle vessels that require exacting specifications.

Fractionating Column—72" Dia. X 110'-0" length, ¾" wall thickness with 40 trays. All welds 100% X-ray quality. Constructed for internal pressure and full vacuum. Stamped A.S.M.E. Code. Total weight 83,000 lbs.



Heat Exchanger — Lower Section 4'-0" dia. X 14'-0". Upper Section 1'-8" dia. X 10'-0", ⅝" Carbon Steel Plate Wall. A.S.M.E. Code construction using tube bundle of schedule 160 pipe.

Styrene Stripping Column—9'-6" Dia. X 80'-0" length, ½" plate walls and ⅝" heads. Constructed and stamped A.S.M.E. Code. Vessel contains 14 stainless steel perforated trays, 16 manways, 146 couplings, and nozzles. Total weight 72,000 lbs.

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Check 1135 opposite last page

Steam-jacketed kettles due to cut solvent loss at American Cyanamid

Three steam-jacketed kettles which are expected to substantially cut solvent loss have been fabricated for the American Cyanamid Company's plant at Fortier, La.

The kettles are designed to serve as stills to recover solvent from polymer slurry. Slurry entering kettles is regulated by purge-type level controllers as solvent evaporates. A two-speed agitator provides slow speed to prevent overloading as slurry thickens.

Substantial reduction in solvent loss is expected from these steam-jacketed kettles

Each kettle can handle 16,800 lb of slurry containing 10% solids in 24 hours. When dumped, residue will contain about 3% solvent, less than one-tenth the amount lost by previous recovery method.

Each kettle has working capacity of 550 gal. It will operate at 205°F and 27 to 28" vacuum. Heating steam is supplied at 150 psi.

(Kettles were fabricated by Buflovak Equipment Division, Blaw-Knox Company, Buffalo, New York.)

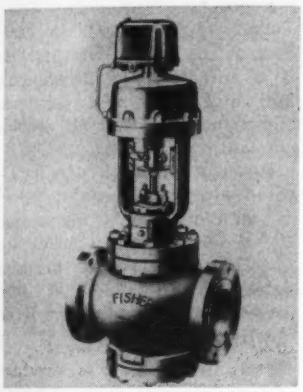
Check 1136 opposite last page.

Nitric acid concentration plant of an improved design is described in four-page brochure. "100% Nitric" — Badger Manufacturing Company, 230 Bent St., Cambridge, Mass.

Check 1137 opposite last page.

Pneumatic piston operator has higher speed, more force

Uses: For applications where more force and higher stroking speeds are required than are available from diaphragm operators. Special long cylinder can be furnished to give longer strokes for operation of butterfly valves and damper controls.



Piston operator is suitable for wide range of instrument signals

Features: Unit creates stem forces from 1500 to 12,000 lb. Stroking speeds range up to 1.5" per second.

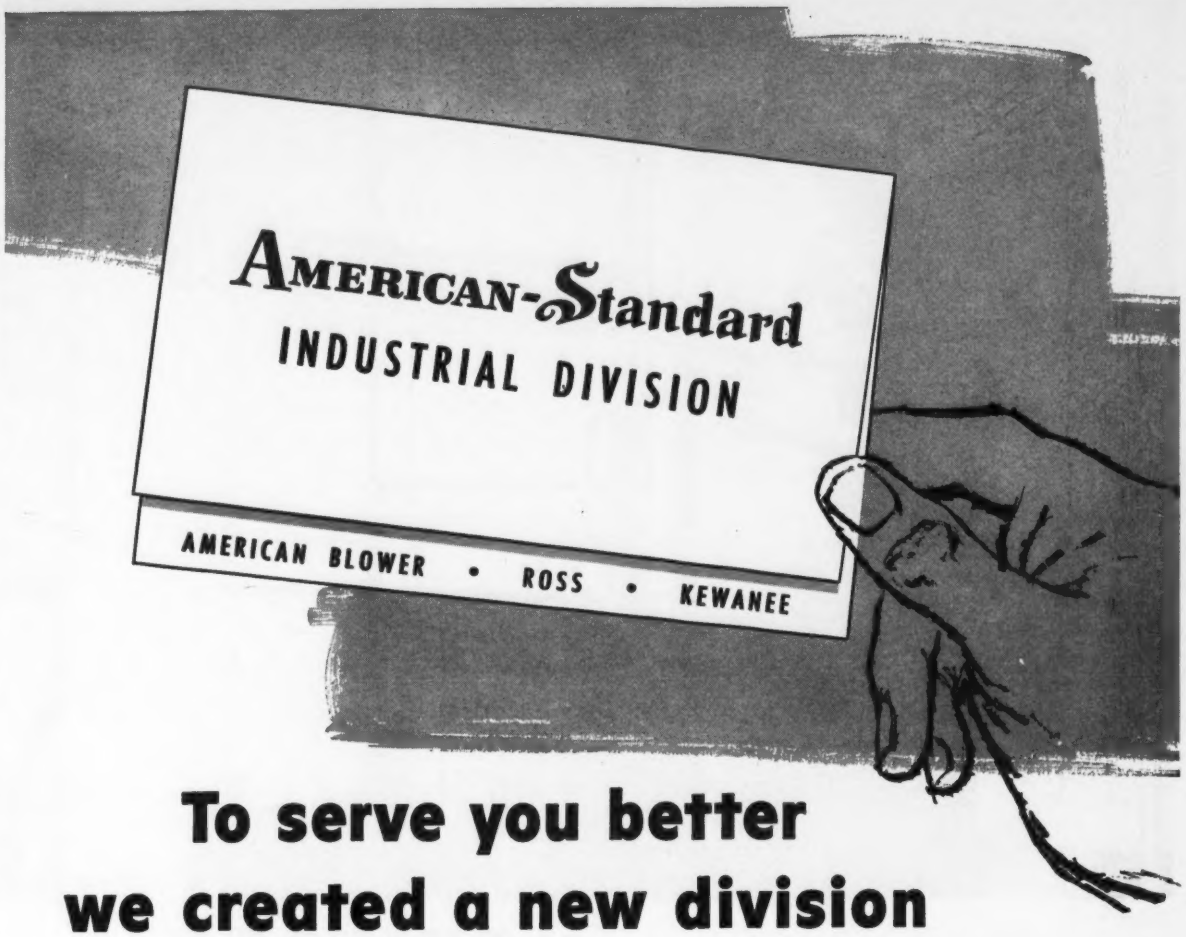
Description: High-pressure pneumatic piston operator has an enclosed positioner mounted on the cylinder, suitable for a wide range of instrument signals. It operates on any supply pressure up to 150 psi. Unit is easily reversible in the field. Accessories available include manual side-mounted handjack, hydraulic snubber, and other equipment.

(Type 470 POP pneumatic piston operator is product of Fisher Governor Company, Marshalltown, Iowa.)

Check 1138 opposite last page.

Aluminum heat exchangers and the advantages of using them are discussed in 16-page publication. Aluminum heat transfer rates, temperature properties, tensile strengths, corrosion resistance, and other characteristics are covered. Bul 732-1-1 Reynolds Metals Company, Dept. PRD-2, PO Box 2346, Richmond, Va.

Check 1139 opposite last page.

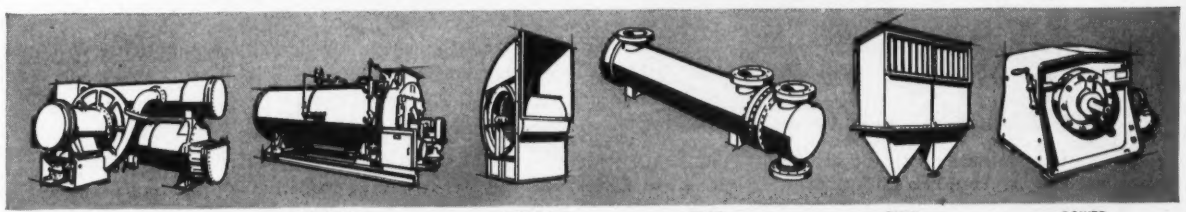


To serve you better we created a new division

Now you can benefit from the combined engineering backgrounds and product lines of three American-Standard* Divisions — American Blower, Ross Heat Exchanger, and Kewanee Boiler — consolidated into one organization under a new name!

Here is one-source responsibility for quality and performance in equipment that is designed, engineered, and manufactured to work together . . . with engineer-staffed offices in major cities. Bulletin B-5829 gives all the facts on: American-Standard Industrial Division, Detroit 32, Michigan. In Canada: American-Standard Products (Canada) Limited, Toronto, Ontario.

One-source responsibility in all six major fields



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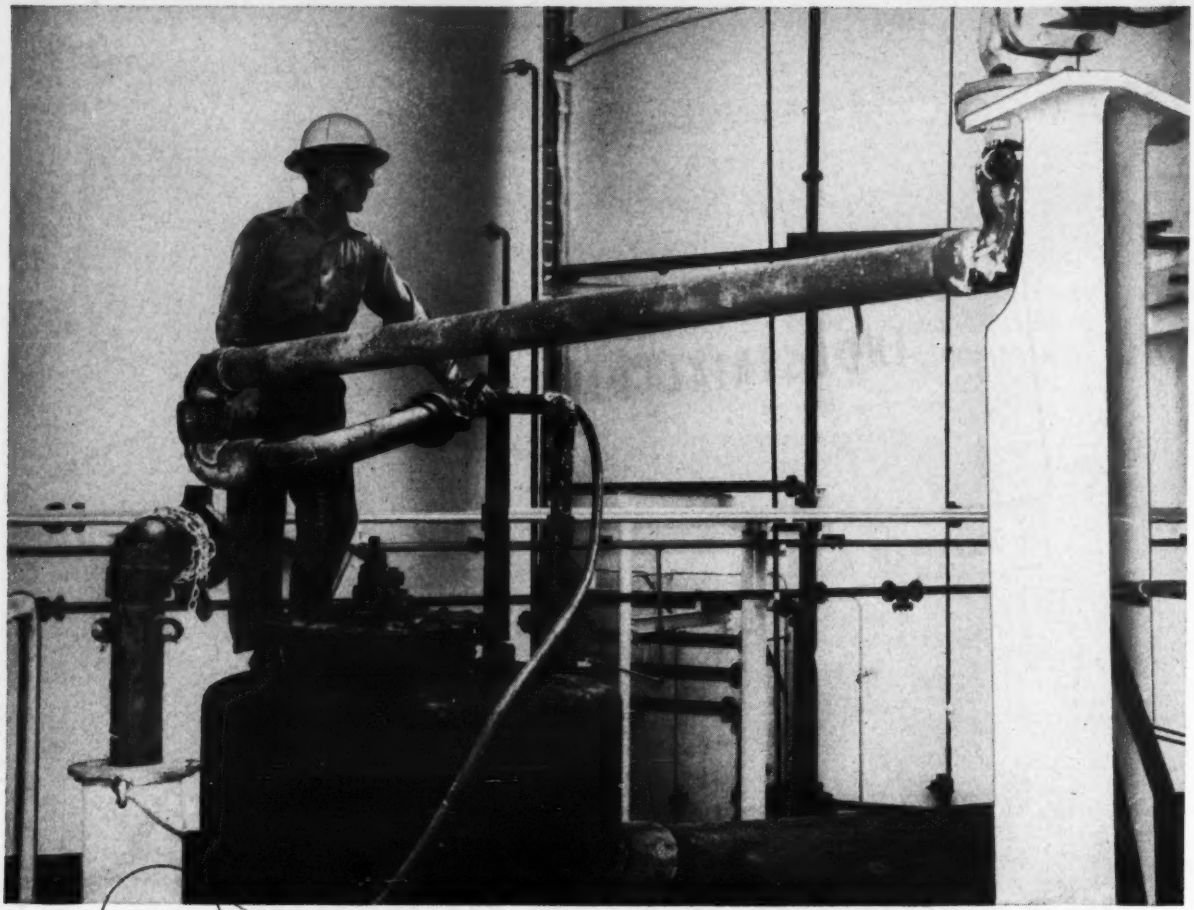
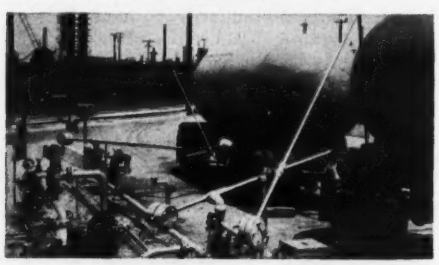


IN FLUID HANDLING— CHIKSAN

LOADING ARMS

give hard-to-handle liquids a SAFE SEND-OFF . . .



Chiksan Loading Arms deal with hard-to-handle corrosive chemicals, hydrocarbons, and other fluids and gases, speedily and safely, in all kinds of weather.

Chiksan Loading Arms, with their versatile ball-bearing swivel joints, combine unlimited flexibility with the safety and longevity of metal. With Chiksan there's never a problem of hazardous, often costly, line rupture loss. In fact, whatever fluid you are handling, you get longer life, spend less on maintenance, with Chiksan Loading Arms. Write for descriptive literature today.

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Well Equipment Mfg. Corp. (Division), Houston 1, Texas • Subsidiaries: Chiksan Export Company • Chiksan of Canada, Ltd.

Check 1141 opposite last page

Non-lubricated plug valve uses two Teflon O-ring seals

Will double block, bleed, do job of two valves

Uses: Valve is recommended for such purposes as air, gas, water, steam, propane, and hydrocarbons.

Features: Valve has two Teflon O-ring seals in the face of the plug. This permits it to effectively double-block and bleed in most services. Hence, it does the job of two conventional valves.

Description: Non-lubricated plug valve can be used in temperatures from minus 300 to 400°F at pressures up to 720 psi. Design permits valve to hold against line pressure upstream as well as downstream.

(Wedgeplug valve is product of Stockham Valves & Fittings, 4006 North 10th Ave., Birmingham 2, Ala.)

Check 1142 opposite last page.

Compressors automatically monitored, controlled

Simplified maintenance cuts operational costs

Uses: Continual supervision and checking of compressor operation.

Features: Automatic system eliminates routine inspection.

Description: Compressor control system checks air and lubricating oil pressure and temperature, cylinder lubricator operation, and float level in condensate trap. It also watches for leaking valves and mechanical failure.

Upon abnormal compressor operation, audible and visible warnings are given. If this results in no corrective action, compressor is shut down by system. The system can be supplied for machines ranging in size from 100 to 7500 hp.

("Tendamatic automatic compressor control system is a product of Ingersoll-Rand Co., 11 Broadway, New York 4, New York.)

Check 1143 opposite last page.

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U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

World's Largest Industry-Owned Research Reactor Opens at Plainsboro, N. J.

U.S.I. One of Ten Participants

On January 19, Industrial Research Laboratories, Inc. (I.R.L.) — the world's largest nuclear reactor financed entirely by private funds and devoted solely to industrial research — made its formal bow at Plainsboro, N. J. U.S.I. and nine other companies are participating in the venture, using the reactor as a tool for basic and applied studies in many fields.

The fields of interest of the participants include alcohol, chemicals, special metals, plastics, tobacco, machine tools, explosives, packaging, glass, lead, electronics, oil and rubber. This wide range of interests will make I.R.L. a major contributor to the "Atoms for Peace" prog am.

The five-million-watt "swimming pool" type reactor is housed in an 87-foot-high, aluminum-sheathed "beehive" of reinforced concrete. It

MORE

Methionine Bibliography Now Available from U.S.I.

Readers of the November U.S.I. Chemical News have expressed tremendous interest in the lead story on methionine absorption through the skin. Hundreds of letters, telegrams and phone calls have been received asking for more complete information. To answer these many requests, we have prepared a selected bibliography of published articles on the oral and topical applications of methionine, which should prove very helpful to interested parties.

This bibliography is now available on request.

Have You a New Product To Tell the World About?

Make it routine to send your publicity releases on new products and developments to the Editor of U.S.I. Chemical News, often called the "Front Page of the Chemical Process Industries." The issue you are reading right now will be printed in over 250,000 copies of the leading publications serving the chemical and related fields. The Technical Developments column alone will probably produce over 600 inquiries, judging from the past average. You incur no charges or obligations by sending us your new product releases. The material will be judged and used solely on the basis of newsworthiness and space limitations. And of course we cannot guarantee that your item will definitely appear because of these considerations.

U.S.I. Reopens Second Chlorine-Caustic Unit At Huntsville, Alabama

Plant Ideally Located to Supply Growing Needs of Southern Textile and Pulp and Paper Industries

U.S.I. increased chlorine and caustic soda output at Huntsville, Alabama recently, when a second unit was put back into operation. U.S.I. has been producing at this location since 1952. The Huntsville plant site offers the benefits of economic freight rates to a large number of users, and is therefore an ideal location from which to supply the chlor-alkali requirements of Southern textile and pulp and paper operations.

Liquid chlorine is available to users in 30-ton and 55-ton tankcars. The future possibility of barge shipments is being studied. Commercial grade, 50% liquid caustic soda is available in 8,000- and 10,000-gallon insulated and lined tankcars as well as in barges.

Both chlorine and caustic soda — products of the electrolytic decomposition of brine — are among the top dozen industrial inorganic chemicals produced in the United States today, in terms of tonnage. In 1957, the most recent year for which U.S. Department of Commerce figures have been reported, 3.9 million short tons of chlorine were marketed, and 4.0 million short tons of caustic soda, on a 100% NaOH basis, were sold.

MORE

Colognes Estimated Sixth In Aerosol Sales in 1958

Early estimates indicate that aerosol cologne sales for 1958 stand at over 26 million units. This would be an increase of about 50% over the 1957 sales figure of 18 million units. U.S.I. reports that the rise in its sales of anhydrous alcohol from 1957 to 1958 for aerosol cologne applications supports this estimate. Industry spokesmen reveal that 1958 was the first year in which aerosols accounted for over half the cologne market, in terms of dollar volume.

In 1958, as in 1957, colognes will probably rank sixth in unit sales among aerosol products, when all figures have been tabulated. The 1958 sales volume ranking should look much as it did in 1957, with hair sprays, shaving lathers, room deodorants, insect sprays and coatings taking the first five places.

Cell room of chlorine-caustic soda unit, U.S.I. plant, Huntsville, Alabama.

★ U.S.I. CHEMICAL NEWS ★

CONTINUED

Chlorine & Caustic

Chlorine End-Use Pattern by Industry

INDUSTRY	PERCENT OF TOTAL
Pulp and Paper	15.0
Chlorinated Solvents	13.0
Automotive Fluids	11.0
Plastics and Resins	11.0
Insecticides and Herbicides	7.5
Refrigerants and Propellants	5.0
Water and Sewage	3.5
All Others	34.0
TOTAL	100.0

Caustic Soda End-Use Pattern (Estimated)

END-USE	PERCENT OF TOTAL
Chemicals	26.9
Rayon and Film	17.8
Pulp and Paper	6.6
Export	5.8
Petroleum Refining	5.5
Lye and Cleansers	4.1
Textiles	3.5
Soap	2.1
All Others	27.7
TOTAL	100.0

Organic Derivative of Hypochlorous Acid Being Tested in Cancer Surgery

Surgeons are testing an organic derivative of hypochlorous acid — a form of monoxychlorosene — as a wash for cleaning cancer wounds after operating. Used in this manner, the material has been successful in halting the growth of cancer cell seedings in rats after cancers had been removed surgically. The chemical is not a cancer cure however.

The material is being employed widely in cancer operations on humans at the present time. Thus far the usual post-operative tests via supravital staining techniques reveal that all cancer cell seedings remaining in and around the wounds are destroyed by the wash.

The hypochlorous acid raw material for this compound is unstable and not available commercially. It must be prepared by the reaction of chlorine with water.

CONTINUED

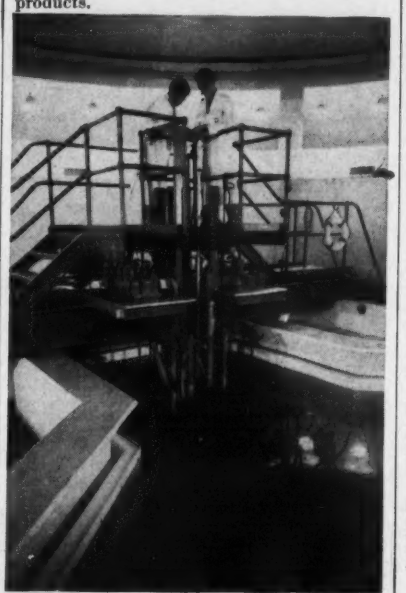
Reactor

is producing its chain reaction under 37 feet of demineralized water which serves as moderator, coolant and shield. The unit provides a source of neutrons, gamma rays and radioactive isotopes for study.

A permanent staff of 30-40 scientists and technicians is operating the reactor. In addition, participating companies maintain permanent staffs in individual research laboratories.

U.S.I. Studying Processes, Products

U.S.I.'s participation in this new undertaking is one more step in its expanding research program. Basically, its investigation will cover nuclear radiation for initiating or modifying chemical reactions, for controlling production processes, and for developing and testing new products.



Technicians load core of new I.R.L. nuclear reactor with fuel elements preparatory to start of operation. Core is 37 feet below surface of water which acts as coolant, shield.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Sodium and potassium borohydride information is presented in 34-page manual now available. Properties, reactions, handling are discussed. Thirteen tables cover technical data collected from other published works. **No. 1450**

The 1958 edition of "Annual Review of Biochemistry" can now be purchased. It is a 775-page volume, containing 22 sections by different authors, covering developments in all biochemical fields. **No. 1451**

Heat transfer coefficients in small sodium heat exchangers are discussed in a reprint now available. Empirical equations are developed for calculating the over-all heat transfer coefficients for tube and annulus exchangers. **No. 1452**

Molybdenum hexacarbonyl is now available commercially for use as a chemical intermediate, catalyst and vapor phase deposition raw material. Compound and derivatives are under study for dyes, toners, lube additives, etc. **No. 1453**

Rotating-cylinder viscometer, designed for measurement of liquids at very low shear stresses, is now on market. Claimed to be particularly useful for accurate studies of high-molecular-weight polymers. **No. 1454**

New aluminum soap has been developed to gel solvents without use of heat. Bulletin now offered on product tells how to form stable gels from non-polar solvents and mixes of polar and non-polar solvents. **No. 1455**

Automatic, lab-bench zone refiner just developed will give high-purity organic reagents from run-of-bottle chemicals. Said to purify any material with 50-300°C M.P. Greatest use seen for organics hard to refine by usual means. **No. 1456**

Butene-1 can now be obtained with liquid vol. analysis of 98.5% butene-1, 0.0% isobutylene and butadiene, 0.8% n-butane, 0.7% butene-2. Butene-2 now obtainable with 95.0% butene-2, 0.5% butene-1, 1.0% butadiene, 3.5% n-butane. **No. 1457**

Standard fuel elements in 4 types, for use in low-power research reactors, now on market. Availability of standard elements claimed to greatly reduce costs of custom design, special tooling and set-up, special engineering. **No. 1458**

Methyl borate is now available commercially in carload quantity. Material is a widely-miscible, non-aqueous solvent, azeotroping agent, Lewis-acid catalyst and intermediate. Also acts as a neutron absorber and detector. **No. 1459**

PRODUCTS OF U.S.I.

HEAVY CHEMICALS

Caustic Soda, Chlorine

Sodium, Metallic: cast solid in tank cars, steel drums, pails; bricks in barrels, pails.

Sodium Peroxide, Sodium Sulfite, Sodium Sulfate

Ammonia, Anhydrous: commercial & refrigeration. Tank cars or tank wagons.

Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions

Phosphatic Fertilizer Solution: wet process phosphoric acid.

Sulfuric Acid: all strengths, 60 Baume to 40% Oleum. Also Electrolytic grade to Federal specifications. Tank cars or tank wagons.

OTHER PRODUCTS

PETROTHENE® Polyethylene Resins

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Riboflavin USP, Intermediates.

Alcohols: Ethyl (pure and all denatured formulas); Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL PR.

Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, ISOSEBACIC® Acid, Sebacic Acid, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P., Pelargonic Acid, 2-Ethyl Heptanoic Acid.

Animal Feed Products: Antibiotic Feed Supplements, BHT Products (Antioxidant), Calcium Pantothenate, Choline Chloride, CURBAY B-G®, Special Liquid CURBAY, VACATONE®, Menadione (Vitamin K_3), DL-Methionine, MOREA® Premix, Niacin USP, Riboflavin Products, Special Mixes, U.S.I. Permadry, Vitamin B_{12} Feed Supplements, Vitamin D_3, Vitamin E Products, Vitamin E and BHT Products.

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Plastic Containers

From page 30

packaged in this manner. Unit aerosol volume jumped from 40 million in 1951 to 238 million in 1955.

While plastics do not now hold an important part in the manufacture of these containers, their potential is very important. The Chemical Specialties Manufacturers Association has recorded end uses shown in Table 4.

Although an end-use pattern for 1956 is not available, it has been reported that non-food aerosols soared 33% that year over 1955. This enthusiastic consumer acceptance has been in spite of the fact that, with few exceptions, an aerosol product costs considerably more than the same product in a conventional package.

Table 4

End-use Pattern for Aerosols — 1955

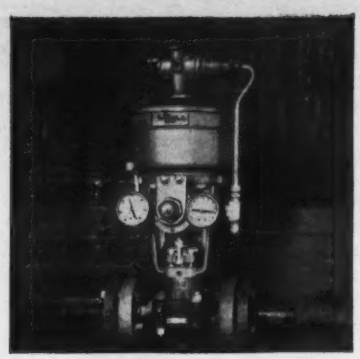
Product	Millions of units
Insecticides, all types	56.0
Hair lacquers	53.8
Shaving lathers	45.4
Room deodorants	32.1
Miscellaneous personal products	14.2
Paints	7.7
Artificial snows	6.8
Household products	6.2
Fire extinguishers	1.9
Miscellaneous non-personal products	9.6
Unclassified end use	5.0
	238.7

Can Cost Tops Product

With can costs running as high as $0.35 to $0.45 in some cases, it is understandable that the aerosol can sometimes costs more than the product.

But one perfume company has reported a 300% sales in-

For more information on product at left, specify 1144 . . . see information request blank opposite last page.



"Best valves we ever found for tight shutoff on our maleic acid lines" says Instrument Foreman of a well-known mid-west chemical plant.

YOU CAN COUNT ON

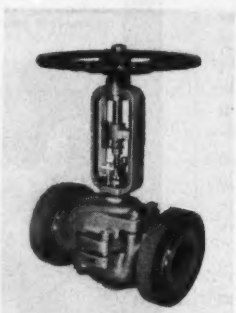
CONOFLOW LB CONTROL VALVES

FOR TIGHT SHUTOFF

Major chemical companies have switched to Conoflow Series LB Control Valves because they provide absolute tight shutoff, regardless of operating variables. Tight shutoff prevents waste of costly liquids and gases . . . insures precise process control.

The answer is the single-seated body and the powerful cylinder actuator of the LB Valve. This integrated body-actuator design allows for leak-proof shutoff not possible with double-seated valves.

An added feature of the LB Valve is much lower all-around maintenance costs. Body separates easily at seat ring for tear down and inspection. Fewer replacement parts mean substantial inventory savings. Streamlined body contours and extra thick walls assure longer life in corrosive and erosive services. Also, when it comes to special alloys . . . type 316 Stainless steel, Hastelloys, Monel, Nickel, Everdur, etc., the single-seated LB Valve offers a substantial initial cost advantage over double-seated construction. By all standards, your overall cost is much less for a Conoflow Series LB Valve.



Also available with sturdy handwheel actuators for precise manual control.

If you are not already a user, try a Conoflow LB Control Valve . . . and let it prove itself.

Phone your nearest Conoflow representative (located in principal cities), or write to Conoflow Corporation, 2100 Arch Street, Philadelphia 3, Pa. for Bulletin LB-3-C.

Cono-Controls®

CONOFLOW CORPORATION

FOREMOST IN FINAL CONTROL ELEMENTS

SUBSIDIARY OF WALWORTH

Check 1145 opposite last page

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FLARELESS FITTING
for connecting
STAINLESS STEEL TUBING
IMPERIAL
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The Stainless Steel Tube Fitting that—

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- Write for Bulletin 3061

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Industry's most complete line of tube fittings and tubing tools

Emblem of Quality

Check 1146 opposite last page

how a wise plant modernization program produced more effective ventilation

When the monitor windows in this large eastern metalworking plant required repairs, they were removed and replaced with Corrulux translucent panels. Twenty-nine Hartzell 44" direct-drive duct fans were installed to give positive, effective ventilation in place of the uncertain, erratic ventilation achieved by natural draft through the old tilting windows. Improved ventilation throughout the building was an immediate result.

This installation suggests one of many ways in which Hartzell fans can be used to improve general plant ventilation. No matter what your plant ventilation problem, Hartzell has the fan or ventilator to help you solve . . . and your nearby Hartzell field engineer has the "know-how" to help you plan the best installation at the lowest possible cost. If you don't know him, drop us a line for his name and address.

HARTZELL PROPELLER FAN CO.
Div. of Castle Hills Corp.
65 Thomas Blvd., Piqua, Ohio

Check 1147 opposite last page

Plastic Containers

From preceding page

crease attributed to its pressurized package. It is this kind of experience, emphasizing the weight that must be given to the consumer appeal factor, which assures the continued growth of the aerosol container.

The development of a food-grade propellant, now the object of concentrated effort, will substantially broaden the end-use market for such containers.

Industrial Research

From page 29

I would like to emphasize that the Department of Justice is not opposed to cooperative research projects among industry members as long as results are made freely available to those industry members without restrictions on their rights to use technological information developed.

Cooperation Cuts Costs

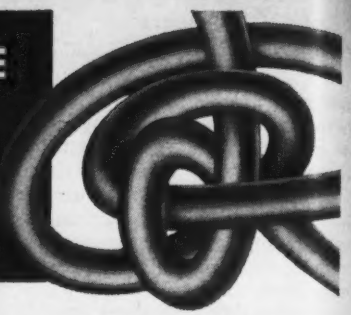
Such cooperative efforts can minimize research costs of industry members and maximize benefits they can obtain from scientific research facilities of other cooperating members.

Similarly, the department believes that a company should be entitled to all protection and competitive advantages it gains through a monopoly granted under patent laws. But patent rights are also geared to other public policies, including the principles embodied in the antitrust laws.

As a result, these laws impose limitations upon use and transfer of patent rights to the same extent applicable to other property rights. And our experience indicates that practices restrictive of research have developed generally out of misuse of patent rights.

The Antitrust Division has taken and will continue to take definite measures to eliminate impediments to

MALTESE CROSS TEFLON HOSE



DOES "THE IMPOSSIBLE"!

Think of it. This new Hewitt-Robins hose offers long service with fluids that cannot be handled in premium standard constructions. Lined with Teflon, the latest DuPont fluorocarbon plastic, Maltese Cross Teflon hose is ideal for rugged steam, chemical, hydraulic, or pneumatic service. Inert to action of a great many corrosive chemicals, including nitric acid and sodium hydroxide, temperature resistant from −65° to 420°F., and non-adhesive to cut flow resistance and simplify cleaning, this hose provides long-term returns on hose investment. Maltese Cross Teflon hose is available in sizes from ½" to 3" i.d. Write Hewitt-Robins, Stamford, Conn., today for Bulletin 4-42.

HR HEWITT-ROBINS

CONVEYOR BELTING AND IDLERS . . . POWER TRANSMISSION DRIVES
INDUSTRIAL HOSE . . . VIBRATING CONVEYORS, SCREENS & SHAKEOUTS

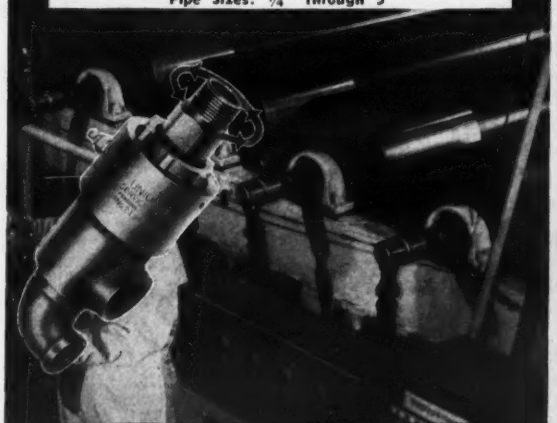
Check 1148 opposite last page

Unmatched for dependability the ROTARY UNION*

Where exact temperatures must be maintained as on this plastic film drier, the ROTARY UNION is without an equal. It is self-adjusting to pressure, self-aligning to stress and strain, and requires no mechanical adjustments. This superb rotating joint is delivering long-lasting and extremely reliable service under the most critical conditions.

Wherever rotating connections are required for heating or cooling, you will find that the ROTARY UNION is your most dependable joint. Write for Bulletin 700 C.

Pipe Sizes: ¼" through 5"



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Check 1149 opposite last page

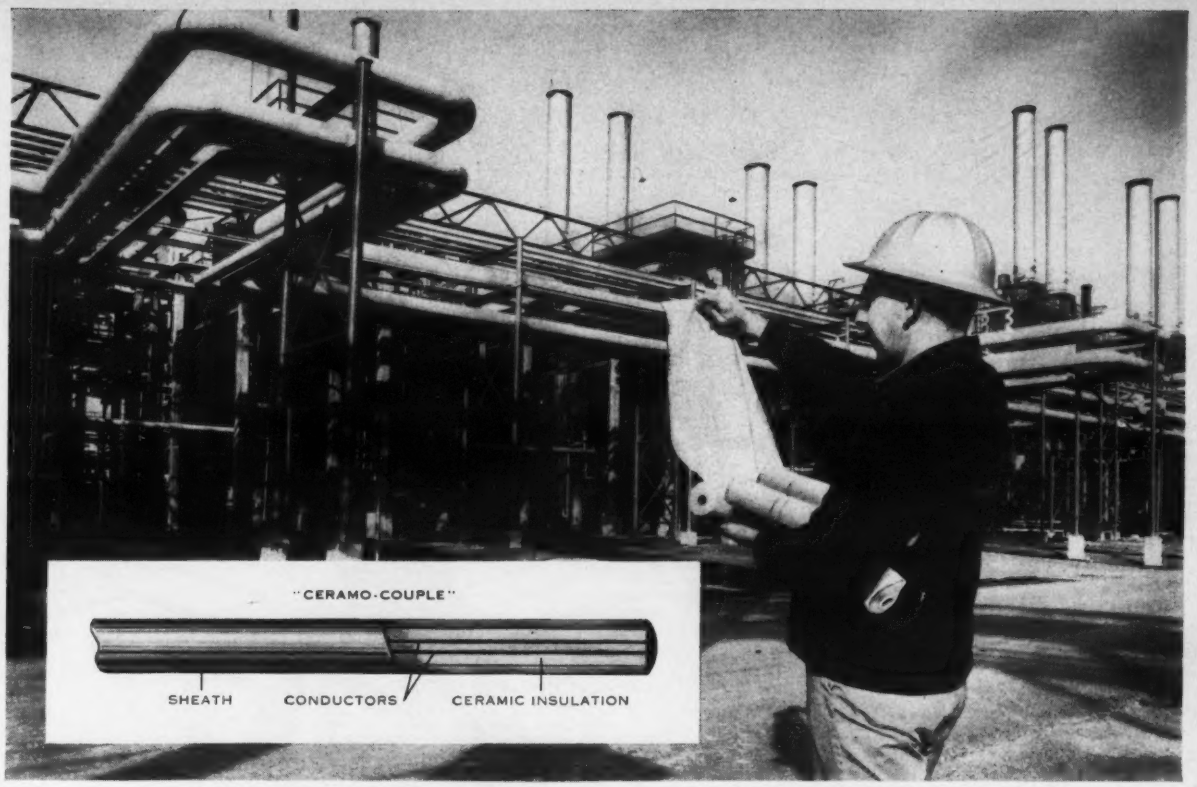
technological competition. We believe removal of such restraints will provide the climate in which industrial research resources can be expanded. Wherever possible, both in consent decrees and in relief proposals made to courts, we have sought to strike down vehicles by which growth of such research is curtailed.

Encourage Competitors

Where illegal monopoly conditions have existed, we have sought to encourage entry of competitors by positive relief measures in decrees. These provisions, among other things, have made available to industry significant patents and worthwhile technology.

As a result of antitrust enforcement in this area, many companies have changed their policies voluntarily, with a corresponding beneficial effect on the growth of industrial research.

Because of the growing importance of research to our national security, and because technological competition is becoming an increasingly important factor in the struggle for markets, we should become more and more alert to those restraints which impede development of research resources.



Process engineer at Sun Oil Refinery examining temperature measurements from "Ceramo" thermocouples.

Ceramo® Thermocouples Help Sun Oil Prevent Furnace Tube Failure

Thermo Electric's Versatile "Ceramo" Solves Another Problem

The Sun Oil Company refinery at Marcus Hook, Pa., found the answer to a difficult problem—preventing tube failure in their process heaters—with T-E's "Ceramo-Couples."

As coking and scaling build up within these tubes, heat transfer is reduced and tube temperatures rise. Unchecked, this condition can eventually result in costly, unscheduled shutdowns and potentially dangerous tube rupture.

Sun Oil also had another problem—rapid thermocouple failure. To measure tube skin temperatures from 500—1200° F. and withstand furnace temperatures to 1800° F., they were using 8-gage, insulated, pencil-type T/C's without protection tubes. Wires became brittle and soon broke. Hot junctions separated from the tube wall and read gas instead of tube temperatures. Process engineers had no confidence in readings. Costly, time-consuming installation of new T/C's was needed after every furnace shut-down.

Sun Oil went looking for a better thermocouple. They found it in T-E's "Ceramo"—ceramic insulated conductors encased in overall metal sheathing. Their 3/16" O. D. "Ceramo-Couples" have 20-gage Chromel-Alumel conductors and stainless steel sheathing. Thermocouple life was greatly increased, replacement was cut in half.

Reliable readings from "Ceramo" permitted operation of process heaters at higher temperatures—thereby increasing production. "Ceramo's" ability to be bent on a small radius without shorting or grounding simplified installation. And "Ceramo" flexed with the differential motion between tubes and furnace walls.

Sun Oil now has about 300 "Ceramo-Couples" in use at Marcus Hook in 5 to 32 ft. lengths. During the 5 years "Ceramo" has been in use, Sun Oil has had no furnace tube failure or unscheduled shut-downs from faulty temperature measurement.

If you have problems of high temperature, moisture, abrasion, corrosion or difficult installation, investigate T-E's "Ceramo." Only "Ceramo" has the quality of materials and construction to meet all these needs.

Write For EDS-45—R

Thermo Electric CO., INC.
SADDLE BROOK, NEW JERSEY
In Canada: THERMO ELECTRIC (Canada) LTD., Brampton, Ontario

Check 1150 opposite last page

Spread out over 35 acres on 97-acre tract, giant multimillion dollar particle board installation is now in full production. Boasting to be largest and most modern of its kind, plant has capacity to produce 40 million sq ft per year of . . .

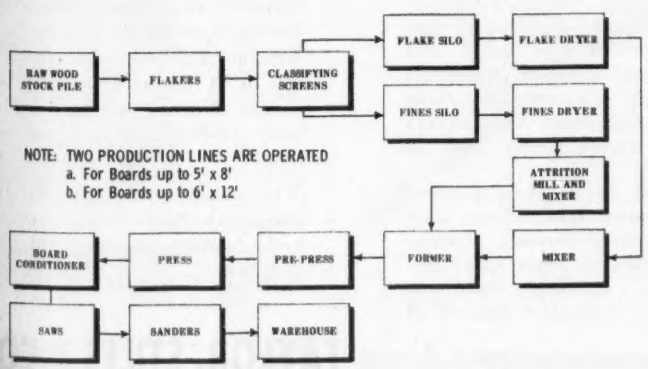
FLAKEBOARD FROM GREEN LUMBER

TED F. MEINHOLD, Associate Editor
with **WILLIAM F. DREES,** Flakeboard Product Manager
Formica Corporation

FLAKEBOARD

Originally developed in Europe, flakeboard is made by combining wood flakes, synthetic resins, and other compounds, such as waxes, and forming board under heat and pressure. Major uses are: 1) As an underlayment for laminated plastics, 2) Furniture core material, 3) Cabinet doors, 4) Flush door faces, 5) Sandwich panel applications, and 6) Decorative wall paneling.

Flakeboard has highest strength-to-weight ratio of any kind of reconstituted or wood particle board on market. For example, conventional board made of ground up particles will have modulus of rupture of between 1200 and 1900 psi at 40 lb/cu ft density. Flakeboard of same weight will have modulus of rupture of 3500 psi. Key point: It's properties can be controlled and varied to meet specific applications.



Simplified flow diagram illustrates how flakeboard is produced at Farmville, N.C.

After cutting, wood flakes are sent to twin 40'-high storage silos. Closed conveyors run up along each side of this ramp

Green pine logs are conveyed from storage pad to flaker house (rear)

STRONGER, tougher, more uniformly controlled particle board is being turned out in record quantity at a new multimillion dollar plant at Farmville, N.C. Owned by American Cyanamid Company and operated by its wholly-owned subsidiary, Formica Corporation, the installation has just about finished passing its "shakedown" test period and will soon reach its 40 million sq ft annual capacity.

The plant is described as the largest and most modern of its kind in existence. Spread out over 35 acres on a 97-acre tract, it uses manufacturing process employing green pine timber instead of wood waste as do conventional processes for making particle board. Formica shared in developing it.

Pilot operations started last fall. Sheet sizes of Formica flakeboard, as product is called, are manufactured as large as 6 x 12'. Thicknesses vary from ¼ to ¾", depending upon end-use of material. Product has a breaking strength of 3500 psi compared to 3000 for conventional flakeboard. It is also said to be easier to machine. Material possesses good handling characteristics and its resistance to water absorption is excellent.

Not a By-product

Formica emphasizes that its flakeboard is **not** a by-product, but is manufactured from green timber (over 40 percent moisture) so that all properties can be scientifically controlled. Research showed that it is impossible to satisfactorily cut flakes from wood waste. The Farmville plant uses about 171 cords of wood each day: 70 percent of which comes in by truck and the rest by rail. All wood is pine, of which there is an ample supply in the area.

Incoming wood is stacked on a 90,000 sq ft, 4000-cord capacity, asphalt pad. From here it is conveyed to a 60 x 120' flaker house where logs are cut to lengths not exceeding 34". Four flaking machines flake 171 cords per day

for the MOST IN DRYING BENEFITS
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—Economical Handling

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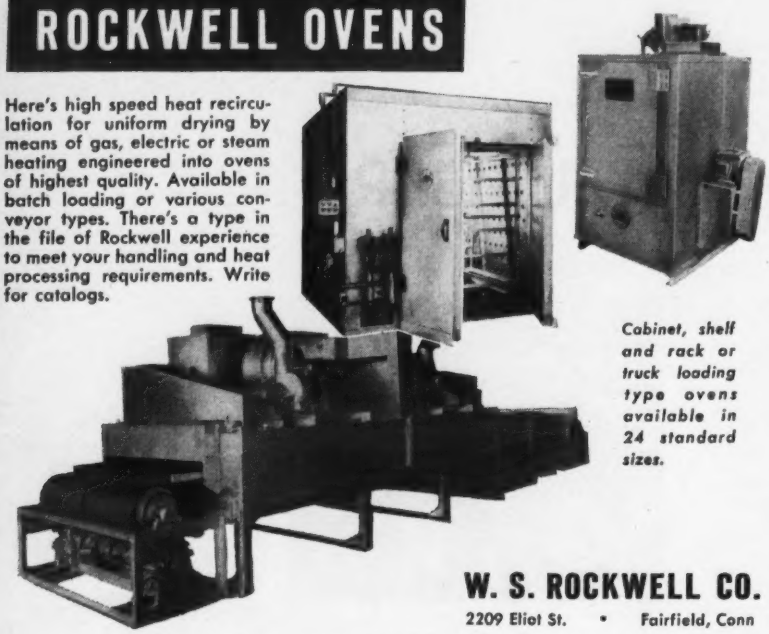
Here's high speed heat recirculation for uniform drying by means of gas, electric or steam heating engineered into ovens of highest quality. Available in batch loading or various conveyor types. There's a type in the file of Rockwell experience to meet your handling and heat processing requirements. Write for catalogs.



Cabinet, shelf and rack or truck loading type ovens available in 24 standard sizes.

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DO YOU KNOW?

BAUER
Single Disc Attrition Mills are Used for

- GRANULATING
- FLUFFING
- BLENDING
- TEXTURIZING
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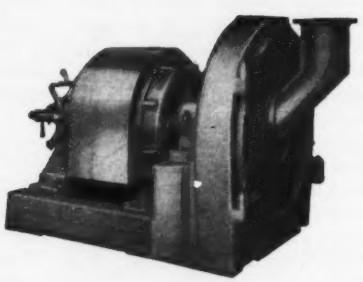
- GRINDING



Available in 7 sizes, 8" to 44" diameter. Ask for Bulletins S-2, A-7, P-13.

If you have a processing problem, we invite you to take advantage of our Research Laboratory. We maintain full-sized machines for evaluating operational data and helping our customers develop new processes.

In addition to single and double revolving disc attrition mills, we offer hammer mills, breakers, crushers, laboratory mills, cleaners, classifiers, specific gravity separators, and related machines. The full line is illustrated and described in our Catalog No. 52. A copy is yours upon request.

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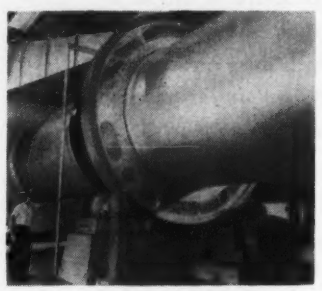
THE BAUER BROS. CO.
1728 SHERIDAN AVE. • SPRINGFIELD, OHIO
Established 1878

Check 1152 opposite last page

or enough to produce maximum of 8960 sq ft of ¾" flakeboard per hr. Machines use 24" diam by 36" long cutterheads weighing 5000 lb. Flakes are about 0.015" thick and 1¼" long. Thickness is rigidly controlled. Widths average ⅜". Length is also precisely controlled.

After cutting, flakes are conveyed through classifying screens to remove any out-of-size pieces and particles that develop in flaking operation. Flakes are then sent to storage. Two silos, 19' diam and 40' high, store flakes, while a third stocks separated fibrous particles. Fibrous particles are later used as surfacing layers of particle board.



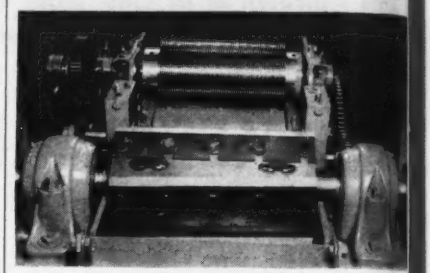
Dryers cut moisture content of flakes down to 4 percent

Dryer building, measuring 60 x 160', houses three dryers — two for flakes and one for fines. These measure 120" diam x 100' long, 104" x 80', and 90" x 70', respectively. Units are air-heated, oil-fired, rotary-type, can take 100 percent wet flakes and dry them down to 4 percent moisture content. Wet flake input capacity for dryers runs approximately 500 lb per min.

Dried flakes then proceed into surge bins where they are metered through a urea-formaldehyde resin spray operation, causing them to pick up controlled amount of resin.

Main production line is located in 100 x 420' building. Treated flakes are laid down in a mat on a steel caul. Patented system assures that all flakes are laid in a horizontal plane, but with the botanical fiber of flakes in random

PELLETIZERS "custom-made" from STANDARD PARTS



CUT YOUR INVESTMENT
MEET YOUR SPECIAL NEEDS

Taylor-Stiles Pelletizers for Polyethylene, Polystyrene, nylon, rubber, sheet cellulose, some vinyls and other compounds give you the special design features you require—with the economy of standard parts.

Models for cutting into strips and cross cutting into pellets are available with several different circular knife arrangements for different materials.

Varidrives, too, are available for instantly changing the length of cross cut.

Taylor-Stiles Pelletizers are standard equipment with many leading plastic and rubber manufacturers. Their uniform cutting, maintenance-free performance, high production rates (up to 10 tons an hour), and overall efficiency will improve your product and save you money.

Why not get *all* the facts. No obligation. Write today for technical bulletins Nos. 210, 213, and 217.

TAYLOR, STILES & CO.
20 BRIDGE STREET
RIEGELSVILLE, N. J.

Check 1153 opposite last page

directions in same horizontal plane. This formation of the mat is highly important and is key to good dimensional stability and other advantageous properties of the board.

Loose mat thus formed passes automatically into a pre-press where it is compressed from about 7" to 3" thick—enough to be fed into main hydraulic presses for curing into boards. Plant has two steam-heated presses for this purpose. Each has 16 openings. Small unit weighs 175 tons, has 102 x 68 x 3" plates. Large press weighs 300 tons, has 150 x 80 x 3" plates. Respective capacities are 1560 and 2750 tons.

Pre-pressed mat is ready for curing in main hydraulic press. Patented system assures that all flakes are laid in an absolutely horizontal plane

Cured boards are automatically discharged from the hot presses and put into cooler and conditioner to reduce temperature. From cooler, boards pass through trim saws which cut them to size. Sanding is performed by eight drum-type sanders using resinal fiber abrasives ranging from 100 to 20 grit. Finished product is stored in 100 x 240' steel warehouse.

(Further information about Formica flakeboard may be obtained from the Formica Corporation, subsidiary of American Cyanamid Company, Cincinnati, Ohio.)

Check 1154 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Mr. Carl Tylka, Director
Cooper Alloy Technical Service Dept.

What's your fluid handling problem? Vanton's Technical Service can help you solve it!

Whatever your pumping, valving, or piping problem—equipment specification, construction material, circuit design and layout—Vanton's fully competent, experienced Technical Service staff can be of help to you.

Headed by Mr. Carl Tylka, this new Cooper Alloy service has been set up to assist industry in solution of fluid handling equipment, design, and operational problems. It typifies Cooper Alloy's forward-looking approach to cooperation between user and supplier.

To set the ball rolling, just write to Carl Tylka, Technical Service director—and you'll get action!

Plastic Gate Valve now available with socket-weld and threaded ends

A complete line of Vanton socket-weld and threaded-end throttlable plastic gate valves is now available from Vanton in sizes from ¼" to 2" in both PVC and Kralastic (U. S. Rubber Co.). What's more, you can have off-the-shelf delivery. The Vanton throttlable gate valve, first of its kind, offers the combined features of straight-through, no-pressure-drop flow with close throttling control. The combination of these two features of a gate and a globe valve makes these Vanton plastic valves the most versatile available. They are being used on the most severe services in the chemical, pharmaceutical, photographic, and other industries. Write for folder.

Another Vanton First:

All-PVC Centrifugal Pump!

Stops Corrosion, Avoids Contamination

Vanton Centrifugal Pumps are constructed with all wetted parts of unplasticized, unmodified polyvinyl chloride, offering the broadest possible range of chemical resistance as well as the non-contaminating transfer of sensitive solutions. Vanton PVC Centrifugal Pumps are generally lower in cost than special alloy pumps for similar applications. Pumps are available in a broad range of sizes: capacity 10 thru 180 GPM; discharge head to 100 ft.

Casing: The heavy sectioned PVC casing is totally protected by a cast iron frame giving rigid support.

Impeller: The impellers are molded, and are of a dynamically balanced design. Vanes are contoured for maximum efficiency.

Bearing Pedestal: Low friction roller bearings are used for quiet operation and are widely spaced to reduce loading. A grease reservoir is provided to assure long bearing life. The heavy duty rugged bearing pedestal allows for rigidity of construction.

Mechanical Seal: Vanton PVC Centrifugals are equipped with mechanical shaft seals of the latest design. Seals are available in a range of materials to cover virtually all corrosive applications. Fluid contacts only facings of rotating and stationary rings. Rotating rings are available in DuPont Teflon or Carbon, and stationary rings in ceramic or Stellite. Stationary rings can be reversed for additional use after long periods of service.

For further information, write to Vanton Pump Division, Cooper Alloy Corporation, Hillside, N. J.

Check 1155 opposite last page

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HEAT RESISTANT FINISH

PROTECTS ENGINE SHROUDS OF THE

MARTIN MATADOR

When USAF TM-61 Martin Matadors are recalled for servicing and refinishing, SICON Silicone finish is specified because it meets the performance required.

Sicon's ability to withstand high temperatures up to 1000°F. without breakdown has won an enviable name for itself in the aircraft industry, as well as in many others.

Write for new SICON Bulletin—Dept. No. 3D.

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...for the Chemical Processing Industry on the West Coast.

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Request Brochure No. M-58

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Continuous . . .
Pneumatic . . . FLYBALL INTEGRATOR

Inherently Accurate!

- Eliminates Inaccurate "Spot Check" Counting!
  Continuous integration assures highest precision.
- Eliminates Cam and Linkage Errors!
  Unique design balances differential pressure signal directly against centrifugal force.
- Eliminates Calculations!
  Automatically extracts square root — shows totals in desired units.
- Eliminates Fire and Explosion Hazards!
  Simple, all-pneumatic operation requires no electric motors, wires, or contacts.

Now you can integrate all your plant flow measurements, including oxygen . . . *continuously* . . . with new accuracy . . . complete safety! The all-pneumatic Foxboro Flyball Integrator completely eliminates intermittent counting and fire hazard. Its simple, force-balance operation utilizes the 3-15 psi air signal from any conventional differential-pressure flow transmitter. This signal is *continuously* balanced against the "flyball" force of the instrument's pneumatically-driven turbine. The square root function is automatically extracted . . . you read flow totals *directly*.

The Flyball Integrator mounts at the point of measurement or on a panel hundreds of feet away. Response and accuracy are completely unaffected by ambient temperature changes or pressure changes in turbine air supply. Ideal solution to all plant fluids accounting and in-process inventory checking. Write for complete details. The Foxboro Company, 814 Norfolk Street, Foxboro, Mass.

FOXBORO
REG. U.S. PAT. OFF.

FIRST IN FLOW

Check 1158 opposite last page

IDEAS

Snow piles eliminated by melting in open pits

Snow accumulations during the past winter were successfully melted in open pits of heated water. Oil and air are piped through separate lines to burners above 5 x 12′ pits. Hot gases shoot down into water-filled pits. This agitates and heats up water.

Snow pushed into pit melted almost instantaneously. Water flowed into nearby sewers. Two-inch blanket of snow over 30,000-sq-ft lot was melted in one hour.

One ton of snow can be melted with two gallons of oil. System permits 98% utilization of gross heating value of oil. Heaters were developed by Esso Research and Engineering Company.

(Submerged combustion heaters are manufactured and distributed by Thermal Research and Engineering Company, Conshohocken, Pa.)

Check 1159 opposite last page.

Chemicals solidify quicksand, permit completion of mine's tunnel-driving

Treated soil easily excavated by conventional methods

Problem: Tunneling had to be stopped when a 22′ bed of water-saturated, fine gray sand was encountered at Pickands Mather and Company's Tioga No. 2 iron ore mine, Grand Rapids, Minnesota. The tunnel, designed to house an ore conveyor belt was being drilled from both ends. Driving was extremely difficult at both upper and lower faces when the sand horizon was reached.

A distance of 178′ remained between the faces. Heavy pressures deformed the steel supporting rings at upper face. There was an inrush of water at the lower face.

All efforts to advance the face failed. Conventional methods of soil stabilization, including use of about 650 bags of cement in grouting, were unsuccessful.

Solution: A chemical method of solidifying the loose sand was decided upon. Process consists of consecutive injection of two solutions — an almost saturated solution of sodium silicate, and a strong saline solution, such as calcium chloride.

Chemical reaction in treated mass causes instantaneous precipitation of a silicic gel, which coats individual sand particles with thin film having high surface tension. Sealing of the mass is effected as gel fills spaces between particles. Additional pressure exerted as cementation continues, causes excess water to be pushed beyond solidified area.

Application started at upper heading. Three series of pipes were driven at the face for introducing the chemicals. The pattern gave a solidified area large enough to permit safe tunnel advance of 6 to 10′ with 2′ thickness of firm ground left in the face.

After pipes were driven to desired depth, specified quantity of sodium silicate solution was injected under pressure. This forced out and replaced water in immediate area. Pipes were then flushed sparingly with water, and the calcium chloride solution was injected. Pipes then were withdrawn one foot and cycle of injections repeated until pipes finally were completely withdrawn from holes.

Results: The chemical soil stabilization process permitted work on tunnel to progress. After a section had been stabilized, crews advanced the face 6 to 8′, leaving a 2′-thick plug of firm ground in advance of the face. Material was excavated easily with pneumatic clay spades, without blasting.

Stabilization and excavation were repeated until quicksand area in upper tube was passed, and normal tunneling could be resumed. Stabilizing crew then started work at lower face after it was possible to resume tunneling in upper tube.

(Further information about Joosten process may be obtained from Chemical Soil Solidification Co., 7650 South Laflin St., Chicago 20, Ill.)

Check 1160 opposite last page.

NEW low soda content: another good reason to

mix imagination with Alcoa Hydrated Aluminas

ALCOA now offers you the lowest soda content ever available in commercial grades of hydrated alumina. Typical soda level of new Hydrated Alumina C-35 is only .040% Na_2O . . . making it ideal for use as a noncontaminating catalyst base, or as an ingredient material for fine aluminum chemicals. Here is just one more example of ALCOA's constant effort to match aluminas to product or process needs. It's another good reason why it pays to mix imagination with ALCOA® Aluminas . . . to make an old product better, or a new product possible. There is probably a type and grade of alumina precisely suited to your own needs. You can get complete information by writing ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 707-D Alcoa Building, Pittsburgh 19, Pennsylvania.

ALCOA CHEMICALS

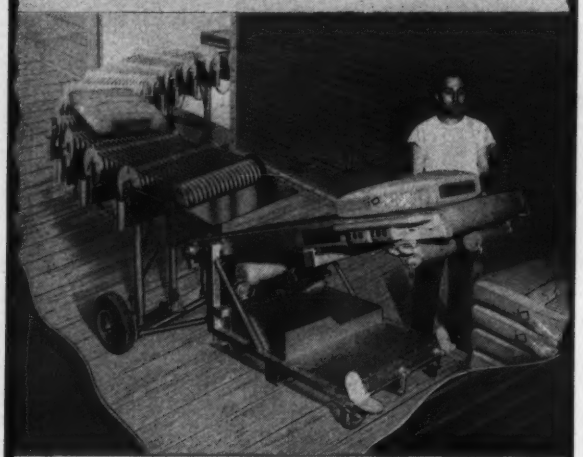
For exciting drama watch "Alcoa Theatre," alternate Mondays, NBC-TV, and "Alcoa Presents," every Tuesday, ABC-TV

For finer products . . . let Alcoa add new dimension to your creative thinking!

Check 1161 opposite last page

One-Man Loading for Box Cars and Trucks Is Now Possible in All Chemical Plants

New Power-Curve Swivel Stacker & Loader Shoots Bags into Place, Replaces Slow Hand Truck



The Power-Curve Swivel Stacker and Loader at a large chemical plant uses but one operator who merely guides bags a little with one hand as they stream into the car direct from the Packer. The single operator replaces a crew of three.

(Special)—The latest in bag loading techniques is now being demonstrated to chemical plant operators who are fed up with the slow, old-fashioned hand wheel truck. A single conveyor-stacker system conveys the bags all the way from the packing machine and speeds up the loading, delivers cleaner, neater bags, reduces in-transit losses, and recovers spillage and loose material within the plant. The Power-Curve system is able to amortize its entire cost in less than a year.

In U.S. and Canadian chemical plants today there are in daily use 184 Power-Curve units, including 46 Packer and transfer conveyors, 61 bag flatteners and elevators, and 77 box car and truck loaders. Virtually every type of dry chemical product is represented in the list of Power-Curve owners, with new additions every month.

Backing up the news of the money saving new system is a network of Power-Curve representatives in all areas equipped with sound movies in color showing actual chemical operations and the effortless loading of the new swivel stacker.

For complete details write

the Chemical Sales Division

POWER-CURVE

CONVEYOR COMPANY

2185 SOUTH JASON ST., DENVER 23, COLORADO

Check 1162 opposite last page

Cutaway model of radioisotopic generator which converts heat from spontaneous decay of polonium-210 into electrical energy

As result of feasibility study of combination of radioisotopic heat source with direct-energy conversion system . . .

SMALL A-POWERED GENERATOR DEVELOPED FOR REMOTE USAGE

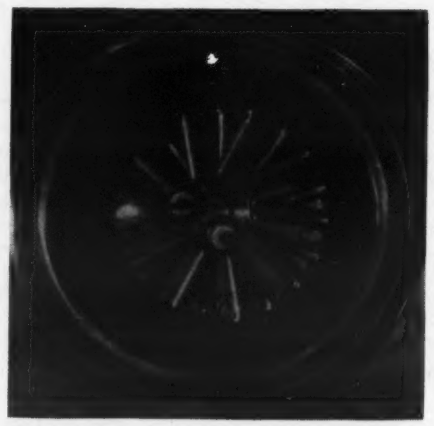
Radioisotope-fueled thermoelectric generator weighing 5 lb has been developed and demonstrated. It produced three watts at five- to six-percent efficiency and has low radiation-dose rate.

The 4¾"-diameter, 5½"-high elongated spheroid, known as SNAP-III (Systems for Nuclear Auxiliary Power), has potential application in any remotely operated device using electric power.

Since it is only intended as demonstration device, present generator is crude model not optimized as to weight and output.

Test results were obtained after first 140-day half-life of polonium 210 radioactive source. With fresh, 3000-curie quantity of radioactivity, device will generate at rated capacity of five watts at eight- to ten-percent efficiency.

Capability of generator is 2900 w-hr/lb over 280-day, two-half-life period. This energy is equivalent to power from more than 1450 lb of nickel-cadmium batteries.



Spokes in generator are lead telluride thermoelectric elements. Device has potential applications in navigation and space exploration

How it Works

Energy liberated in spontaneous decay of radioisotope raises temperature of metallic core and container surrounding it. This hot-junction temperature starts

movement of electrons.

Twenty pairs of semi-conductor thermoelectric conversion spoke-like elements extend from center to code junctions along inside of outer wall. Elements are lead telluride rods. They are alternately doped to produce excess or deficiency of electrons.

Elements are connected in series between hot and cold junctions. Seebeck emf is generated between hot and cold junctions.

Polonium 210 with half-life of 138 days was used in this prototype because of low gamma radiation associated with alpha decay. Many other isotopes, including some nuclear-fission-waste products, could also be used.

Certain isotopes would give large increase in w-hr/lb without correspondingly large increase in weight of unit. However, use of these isotopes would necessitate additional shielding during handling.

Uses

Device of this type could be used to power satellite transmitters for extensive periods. Such applications would be limited to energy level of less than 1000 w.

In ground level applications, cold-junction heat can be dissipated more easily. This would boost the device's electrical output. Units could be used in remote weather stations, air-lane marker and warning beacons, navigational buoys for sea lanes, and many other applications.

(Prime contract for development of radioisotope-fuel thermoelectric generator was awarded by AEC to Nuclear Division of The Martin Company, Baltimore, Maryland.)

Processing equipment and uses in distillation, evaporation, drying, crystallization, extraction, absorption, heat transfer, and other processes is pictured and described in 48-page catalog. Statistical data of interest to engineers and estimating departments is also included. Processing equipment catalog—Acme Coppersmithing & Machine Co., Oreland, Pa.

RAYMOND Whizzer SEPARATION

CONTROLS THE QUALITY OF YOUR PRODUCTS

RAYMOND Double Whizzer Mechanical Air Separator

Built in ten sizes up to 18' diameter

THE Raymond Mechanical Air Separator with its efficient Whizzer action offers special advantages in classifying powdered materials for the chemical, food and process industries. It has three general types of application covering a wide range of products.

(a) In closed circuit with a grinding unit for increasing fineness and mill capacity.

(b) In open circuit operation for removing a coarse fraction to deliver a uniformly fine product.

(c) In open circuit for dedusting operations to remove objectionable fines in making granular products.

The Whizzer principle gives sharper separation with a greater percentage of recovery of fines, and also provides a wide classification range up to 99.9% minus 400-mesh materials.

Raymond Separators may be provided with an internal air distribution system for handling special materials, which require some cooling or drying. For classifying abrasive materials, additional liners are furnished.

For improvement of your products, specify the Raymond Whizzer Separator for classifying such materials as fine chemical hydrate . . . graphite . . . diatomaceous earth . . . moulding compounds . . . phosphate materials . . . corn sugars . . . starches . . . special flours and many similar products.

Laboratory Separator for classifying small batches in test work

For further details, write for Raymond Separator Bulletin #76

COMBUSTION ENGINEERING, INC.
Raymond Division

1116 W. BLACKHAWK ST.
CHICAGO 22, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

Check 1163 opposite last page

SAFE SEALING WITH FLEXITALLIC

a tradition with engineers since 1912

Flexitallic Spiral-Wound Gaskets are bought for what they do . . . and keep on doing . . . in pipe lines and pressure vessels across almost all industry.

Flexitallic Gaskets are the safe seal, preferred by engineers since the development of the original Flexitallic Spiral-Wound construction in 1912.

In confining fluids at high pressures, and high temperatures, engineers know and depend on Flexitallic Gaskets because:

- The compression characteristics for a given series are always related to the bolting load for that series.
- With the gasket design determined, exacting mechanical controls assure that manufactured gaskets conform to specification.

To get this unvarying standard of quality in Spiral-Wound Gaskets, look for the blue dye in the Canadian asbestos filler — Flexitallic Blue, the mark of an engineered Flexitallic Gasket.

FLEXITALLIC GASKET CO.
8th & Bailey Sts. Camden 2, N.J.

Flexitallic®
SPIRAL-WOUND GASKETS

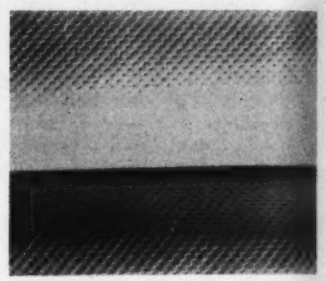
FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

*Flexitallic is a registered tradename. No one else can make a Flexitallic Gasket. Look for *Flexitallic Blue* — it's our exclusive blue-dyed Canadian asbestos filler.

Check 1164 opposite last page

Oil-absorbent paper has softness, strength

Paper which is soft and oil-absorbent without being weak is product of recently developed process. Engraved rolls simultaneously perforate, emboss, and weld plies of paper.



Mating rolls give minimum compression on paper

Matched, mating male rolls leave paper largely uncompressed.

Only compressed areas are sloping sides of raised bumps or crests. Paper thus produced has greater oil-absorbency and capacity, good adhesion between plies, increased bulk and improved wiping surface.

(Perf-embossed paper is a product of Scott Paper Company, Chester, Pa.)

Check 1165 opposite last page.

Simplified system scuttles polyether foam production complexity

Utilization of a one-shot system greatly simplifies conversion of basic urethane chemicals into commercial cushioning slab stock. Formerly, foams were produced by procedure requiring extensive pre-mixing of basic ingredients to form prepolymers prior to foaming phase. Also, a time-consuming curing period for green slab stock was necessary.

A one-shot process was difficult to master because of critical balance of catalyst activity required. A new combination of catalysts, using metallic compounds as key ingredients, is basis for process which speeds up foam pro-

duction cycle and gives increased control over chemical reaction during foaming.

(Further information about one-shot polyether foaming system may be obtained from Mobay Chemical Company, 1815 Washington Road, Pittsburgh 34, Pa.)

Check 1166 opposite last page.

Fluorocarbons modified at 25 percent less cost by radiation grafting

Treated polymers are bondable and dyeable

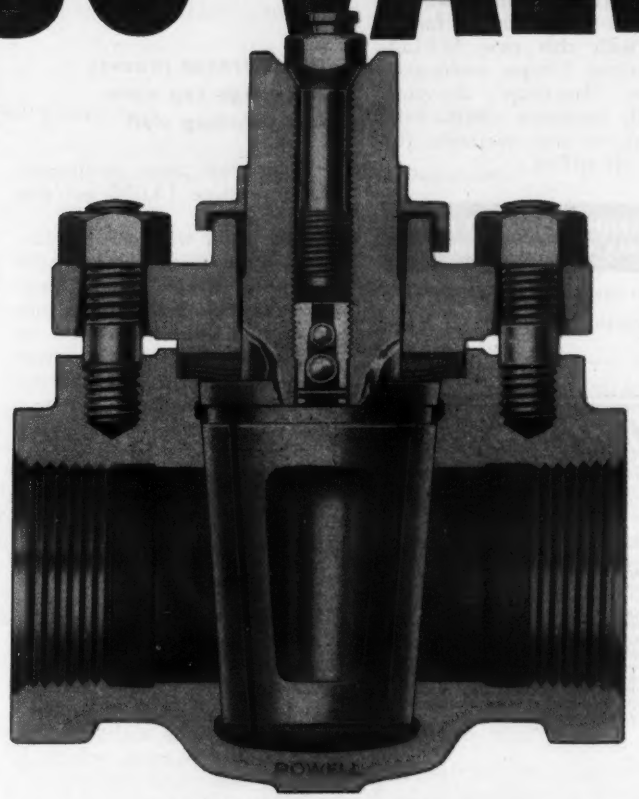
Cost of modifying fluorocarbon polymers has been slashed 25% through use of radiation. A New York firm reports that it can successfully add bondability and surface-dye-acceptability to the materials through use of the nuclear technique. Grafted products are tough and are corrosion and temperature resistant. Their wax-like surfaces permit very few substances to adhere to them.

Neither bondability nor ability to accept surface colors is possessed by unmodified fluorocarbons. Bondability has previously been achieved by post-fabrication modification, which is expensive and has other disadvantages. In addition to cost advantages, radiation grafting provides bondability to a fluorocarbon without altering its color.

Pilot run of polymers being removed from "pit" where exposure to Cobalt-60 radiation source takes place

Radiation grafting permits manufacturers to fabricate polymers in conventional ways, without adding coloring,

POWELL
LUBRICATED PLUG VALVES



Sectional-Powell Lubricated Plug Valves, Single Gland type. Also available with Flanged Ends.

Powell Lubricated Plug Valves have many advantages over conventional types of Valves:

- Simple design: only 3 basic parts—body, bonnet, plug.
- Quick, complete shut-off.
- Tapered Plug assures positive seating.
- Machined surfaces of plug and body are not exposed in open position.
- Cavity-free straight passage assures streamlined flow.

Available in sizes ½", through 16", depending on the type required—semi-steel 175 and 200 pounds WOG; carbon-steel ASA 150 and 300 pounds. Also in other alloys on special order.

For complete information, write for our new Lubricated Plug Valve Catalog, Number PV-5. Or contact your local Powell Distributor.

The Wm. Powell Company • Cincinnati 22, Ohio
Dependable Valves Since 1846

POWELL...world's largest family of valves

Check 1167 opposite last page

Simplify, Speed Up
DRUM HANDLING

with New
Weld-Bilt HY-BOY Portable Drum Elevator

"Weld-Bilt" PRODUCTS

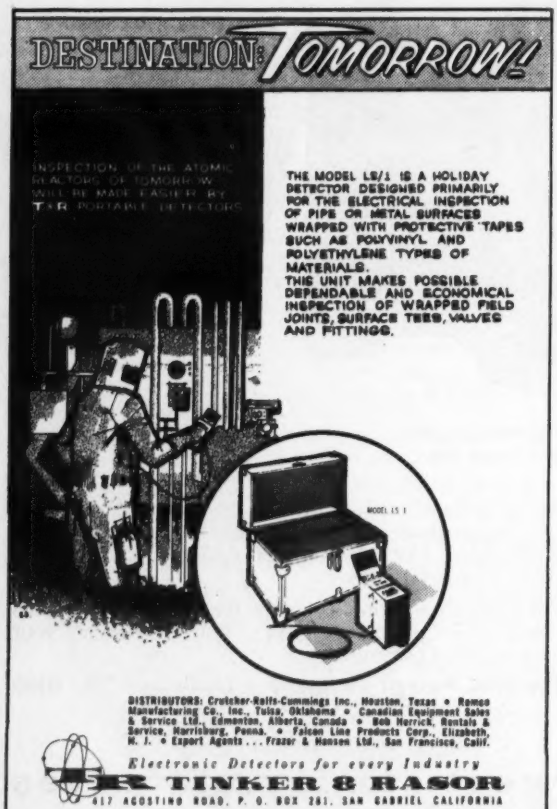
You can lift, transport, store and DUMP all sizes of drums faster, easier, with this new WELD-BILT Portable Drum Elevator. Unique worm-gear tilting mechanism makes "last-drop" dumping safer, more efficient, with minimum effort. Lift, electric-hydraulic operated, is also available for hand operation or fully electrified.

Write for prices on this important time and labor-saver.

WEST BEND EQUIPMENT CORP.
MATERIALS HANDLING ENGINEERS
322 Water Street, West Bend, Wisconsin

Check 1168 opposite last page

DESTINATION: TOMORROW!


INSPECTION OF THE ATOMIC REACTORS OF TOMORROW WILL BE MADE EASIER BY T&R PORTABLE DETECTORS
THE MODEL LS/1 IS A HOLIDAY DETECTOR DESIGNED PRIMARILY FOR THE ELECTRICAL INSPECTION OF PIPE OR METAL SURFACES WRAPPED WITH PROTECTIVE TAPES SUCH AS POLYVINYL AND POLYETHYLENE TYPES OF MATERIALS.
THIS UNIT MAKES POSSIBLE DEPENDABLE AND ECONOMICAL INSPECTION OF WRAPPED FIELD JOINTS, SURFACE TEES, VALVES AND FITTINGS.
MODEL LS 1

DISTRIBUTORS: Crutcher-Rolfs-Cummings Inc., Houston, Texas • Romco Manufacturing Co., Inc., Tulsa, Oklahoma • Canadian Equipment Sales & Service Ltd., Edmonton, Alberta, Canada • Bob Herrick, Rentals & Service, Harrisburg, Penna. • Falcon Line Products Corp., Elizabeth, N. J. • Export Agents . . . Frazer & Hansen Ltd., San Francisco, Calif.

Electronic Detectors for every Industry
T&R TINKER & RASOR
617 AGOSTINO ROAD, P. O. BOX 261, SAN GABRIEL CALIFORNIA

Check 1169 opposite last page

and having it surface-dyed later. This simplifies inventory control problems too. Large variety of colors no longer have to be stocked or run through the forming step.

Cobalt-60 source is currently being used as radiation source. Machine sources may also be used in the near future.

(Further information about radiation grafting may be obtained from Radiation Applications, Inc., Long Island City, New York.)

Check 1170 opposite last page.

Direct-freeze process to change sea aqua into drinking stuff

Pilot plant being constructed to produce 15,000 gal/day

Sea water will soon be converted into fresh water in pilot plant using new direct-freeze process. Scheduled to go into operation this summer at Syracuse, New York, plant will be capable of producing 15,000 gals of fresh water a day.

The pilot plant will occupy an area about 25 x 40′ and will be equivalent in height to a 3½ story building. Under the test program, both the technical and economic potential of the direct-freeze process will be evaluated.

The plant is being built with a view of qualifying the process for one of the million-gallon daily production demonstration units authorized by the 85th Congress, which is vitally concerned with the rapidly developing water shortage in many parts of the U.S.

(Work on direct-freeze saline conversion process is being conducted by Carrier Corporation, Syracuse 1, New York.)

Nuclear instrumentation as used in research and industry is outlined in 51-page, 4-color book. Bulletin covers such subjects as principles of scintillation techniques, applications of multichannel analyzers, and instrumentation for neutron physics. Bul may be obtained by submitting $2.00 direct to Radiation Counter Laboratories, Inc., 5121 West Grove St., Skokie (Chicago), Ill.

FOR ABSOLUTE LABORATORY UNIFORMITY . . .

THE *Marion* MIXER
. . . IS STILL THE LEADER

FOR MIXING:

- Dry and Semi-Wet Chemical Powders
- Agricultural Chemicals
- Materials for the Plastics Industry
- Materials for Chemical Processing Plants
- Sweeping Compounds
- Pharmaceuticals
- Fertilizers

A uniform mix is assured time after time, no matter how complicated the formula, and with laboratory exactness. If the formula is right —the MARION MIXER will mix it with complete accuracy.

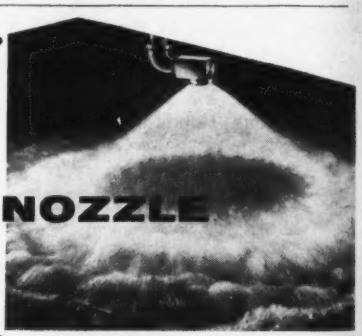
THE EXCLUSIVE MARION MIXING and BLENDING ACTION will handle any type of chemical materials and give a top quality mixed product at less cost.

Send Today For Free Descriptive Literature

RAPIDS MACHINERY COMPANY
865 11th Street Marion, Iowa

Check 1171 opposite last page

got a **SPRAY NOZZLE** *problem?*



perhaps one of our **DATA SHEETS** *can suggest a solution*

For almost every spraying application, there's a Spraying Systems Data Sheet that gives useful information on suggested installations and types of nozzles to use. If you have a problem, write and let us know the application involved . . . and we'll send the Data Sheet that applies.

SPRAYING SYSTEMS CO.
3216 RANDOLPH STREET • BELLWOOD, ILLINOIS

And . . . for complete spray nozzle information, write for Catalog 24.

Check 1172 opposite last page

Maple sap now gathered with polyethylene tube

Polyethylene-tube systems are being used to gather maple sap. Field testing of tube by New York state and New England farmers indicate increased flow and better-quality sap

Tube can be installed well ahead of sap season, and system can be operated by one man. Dirt, bark, dust, debris, and rain cannot get into sap in sealed tube systems. There

Use of polyethylene-tube system in maple-sap collecting eases making of new taps

is no limitation on location of taps when tube is used.

Flow is not retarded by air in taps. Closed system precludes bucket cleaning. Taps may be washed at end of season by pumping mild solution of chlorine and warm water through the tube. Produced from Union Carbide's Bakelite polyethylene, tube is manufactured by Skyline Industrial Sales, Inc., Titusville, Pennsylvania.

(Bakelite brand polyethylene tube is distributed by A. C. Lamb and Sons, Liverpool, New York.)

Check 1173 opposite last page.

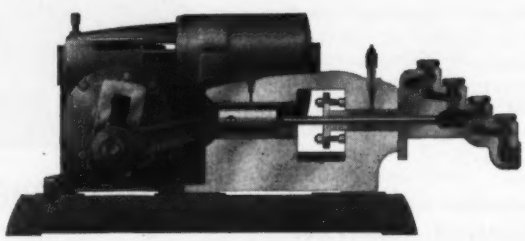
Over 80 cartoons are featured in 32-page general equipment catalog. Descriptions of small mobile cranes, trucks, carts, and safety ladders are included. Catalog with cartoons is available on letterhead request to Precision Equipment Co., 4401 North Ravenswood Avenue, Chicago 40, Illinois.

HOW TO METER SLURRIES ACCURATELY

Few pumping jobs present more complex problems than the accurate metering of slurries. Since they are often abrasive, slurries can make the selection of pump parts extremely difficult. Minute particles settling out in the packing can score a plunger beyond usefulness in minutes. And viscous, tacky slurries can limit ball check freedom and reduce accuracy. But even the toughest slurries *can* be metered accurately . . . by adhering to good slurry handling practice, and by choosing the right pump for the job.

Keep Slurries In Suspension

Several practices that have proved valuable in this difficult service are aimed at keeping the solids in suspension. Suction and discharge lines should be as short as possible. The supply tank should always be well agitated. And if packed plunger pumps are used, stroking speed should be held between 45 and 75 rpm to minimize settling.



Standard Motor Driven Controlled Volume Pump .

Choosing The Right Pump

Controlled volume pumps are manufactured in a sufficient variety of designs to provide a full range of desired characteristics for slurry service. An economy pump such as Milton Roy's H20® can handle slurries up to 5% by weight. Standard motor driven pumps, with minor modification, can handle much denser slurries. And the new ODS (Oliver Diaphragm Slurry*) controlled volume pump can easily manage slurries containing up to 60% solids by weight.

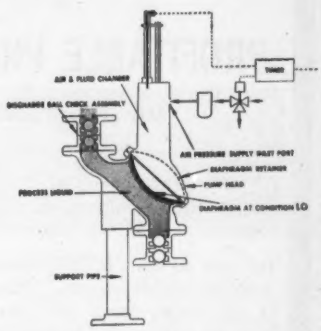
*Manufactured under exclusive license granted by Dorr-Oliver Inc.

Packed Plunger Pumps

Because the entire liquid end of a packed plunger pump is in intimate contact with the slurry, considerable attention must be paid to materials selection. Ball checks and plunger should be as hard as possible, and seats should be relatively soft. Balls are usually made of Hastelloy D, 440 stainless, or ceramic, while 316 stainless is standard for the seats. The plunger must be extremely hard, and high strength sintered alumina is generally recommended.

Proper packing maintenance in slurry service demands that packing be flushed out continuously. An internal flush, continuously bleeding a small amount of liquid along the plunger, is the most common. Dangerous liquids may require an external flush arrangement. Liquid is continuously fed in on one side of the lantern ring, drawn around the plunger, and carried away from the other side.

The ODS Controlled Volume Pump



Capable of pumping 180 gph of the densest slurries at accuracies of ± 2% against pressures up to 90 psi, the ODS has no plunger, no packing. It is based on the Oliver Diaphragm Slurry pump design principle which consists of two opposed chambers separated by a slack diaphragm. A three-way solenoid alternately pressurizes and bleeds air from the upper chamber. With the upper chamber at atmospheric pressure, the suction head forces slurry into the lower chamber. Then, when the upper chamber is pressurized, the diaphragm forces the slurry out through the specially designed ball check valves.

Problem Slurries

Yes, slurries *can* be metered accurately. And the best proof of this claim is the thousand or more Milton Roy pumps successfully metering slurries in the field. The list includes such problem liquids as an 80% coal slurry, a 45% suspension of lead peroxide in butyl phthalate, 15 to 20% diatomaceous earth slurries, finely divided nickel catalytic suspensions, gold ore slurries, and even a 55% by weight powdered aluminum suspension. Some of these materials are so thick that they can support the weight of a screwdriver.

If precision metering of slurries is one of your problems, look again to Milton Roy's 25 years of experience for your most economical solutions. Write for a general introduction to controlled volume pumping given in Catalog 553-1, Milton Roy Company, 1300 East Mermaid Lane, Phila. 18, Pa.

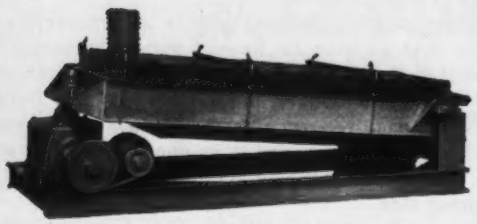
milton Roy
CHEMICAL INSTRUMENTATION SYSTEMS

Controlled Volume Pumps • Quantichem Analyzers • Chemical Feed Systems

Check 1174 opposite last page

ROTEX®

SCREENERS GIVE



PROFITABLE PRODUCTION!

ROTEX FEATURES

- Low head room
- No screen blinding
- Fast screen changes
- Dependable service
- Dust-tite construction
- Rugged construction

For over 40 years ROTEX Screeners have been widely used throughout industry. Today there are installations in the United States and over 25 foreign countries. Built for dependable service, ROTEX are long known for accuracy, capacity and operating economy.

ROTEX SCREENING ACTION:

The nearly level, gyratory motion, pioneered in ROTEX, conveys materials rapidly over screen surfaces with minimum vertical vibration or hop. This stratifies the material by particle size, rapidly passing undersize particles through the mesh openings. The results are clean separations of exacting accuracy coupled with high capacity. Designed for operating convenience, ROTEX Screeners pay for themselves by the economies they effect.

ROTEX WIDE SELECTION:

To meet your requirements: 25 standard models—one to five screen surfaces—many semi-standard and special models—sanitary and all-metal construction available.

Write for Bulletin 401 and information on your screening requirements. Our engineering staff will be pleased to cooperate with you.

MECHANICAL FEATURES

All Metal Screen Box
Self-Aligning Slide Bearings
Quiet Running Counter-Balanced Drive
Heavy Welded Structural Steel Base

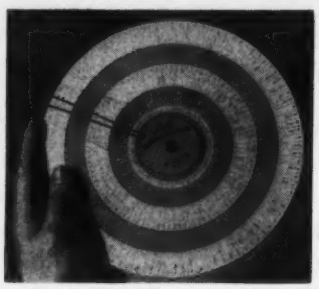
ROTEX | The Orville Simpson Co.
1246 Knowlton St., Cincinnati 23, Ohio

Check 1175 opposite last page

Possibility of reaction quickly predicted

Graphic chemical predictor can quickly determine possibility of chemical reaction for ten thousand different equations.

Utilization of oxidation and reduction potentials following



Chemical-reaction possibility is quickly predicted with 8" diam slide rule

each equation permits prediction as to whether or not reaction will occur. Device also simplifies balancing of equations.

(Graphic chemical predictor is available at $1.95 from Graphic Calculator Company, Department DH, 633 S. Plymouth Court, Chicago 5, Ill.)

Plutonium in rats' bodies enveloped, flushed out by two compounds

Two compounds have proven effective to flush out radioactive plutonium from bodies of laboratory animals. Chelating agents are used to trap metal ions to form stable, water-soluble complex that is relatively chemically inert. The complex is flushed out of body by normal elimination processes.

Compounds are DTPA and BAETA — diethylenetriaminepentaacetic acid and 2:2′-bis[di(carboxymethyl)amino] diethyl ether.

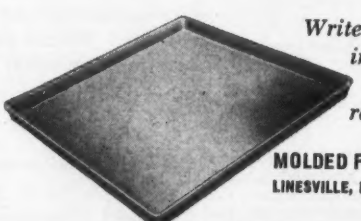
(Studies on flushing out radioactive plutonium from animals are being carried out by Biological & Medical Research Division, Argonne National Laboratory, PO Box 299, Lemont, Illinois.)

I hate trays that botch batches

But have you tried molded fiber glass?

No more leaks or spoiled batches. Toteline Molded Fiber Glass Trays don't corrode. They resist non-oxidizing acids, corrosive salts, weak alkalies, many other chemicals. They're great!

· Anti-corrosive · Won't bend, dent or splinter
· Lightweight · Clean easy · Wire-reinforced edges



Write for complete information and name of nearest representative

MOLDED FIBER GLASS TRAY CO.
LINESVILLE, PA.

TOTELINE MF-59-03

Check 1176 opposite last page

Management at Endo Laboratories Inc. recognized the strong moral and legal obligation of a drug manufacturer toward both physician and patient to be positive of end-product assay. This usually means long tedious lab work. Speed and accuracy both benefit when . . .

INFRARED rides herd on 'guaranteed' product quality

THEODORE W. WETT, Associate Editor
with DR. NATHAN WEINER, Director of Laboratories
Endo Laboratories Inc., Richmond Hill, Long Island, N.Y.

INFRARED'S RISING ROLE IN CHEMICAL INDUSTRY

Infrared analysis is making a move toward greater utilization by all phases of the chemical processing industries. Introduction about two years ago of a low-cost infrared spectrophotometer (see CHEMICAL PROCESSING, March 1957, page 158), promised to provide industry with a rapid technique for infrared analysis at a cost attractive to smaller companies, or as an adjunct to more costly equipment in larger installations.

This promise is being fulfilled. New horizons have been opened for infrared applications.

In a recent survey conducted by the instrument manufacturer, figures showed that over 50% of units purchased went to laboratories with no previous infrared instrumentation. You will find a graphic example of this extended utilization in the story on this page.

Use Pattern

Organic and analytical chemists account for over 75% of instrument operators, interpreters of instrument data, and users of instrument data. In chemical industry, an average of eight people use each instrument, and use it frequently. Weekly operating time for a unit usually runs from 11 to 30 hours.

Survey also brought out interesting facts about buying decisions. Technical decision to buy the instrument was made by technical supervisors over 50% of the time, over 30% by chemists. Technical supervisors also made the budget decision in about 40% of the cases.

Although low-cost infrared has expanded applications of this analytical technique, sales have not been at the expense of higher-priced instruments, still a workhorse in research and development.

Problem: Conventional wet methods of analysis for final assay on a product at Endo Laboratories Inc. often required two-and-a-half to three days. Since company manufactures ethical pharmaceuticals it is imperative that this assay be accurate. However, with a large batch of costly material waiting to be packaged and shipped, speed is equally important.

Control Division of Endo Laboratories Inc. maintains constant and precise quality control of products in all stages of manufacture. Over 400 different raw materials are used. These must be checked against standards supervised by the Food and Drug Administration, and defined by The National Formulary and the U.S. Pharmacopeia. Intermediate product checks help realize final product guarantee and also minimize rejected batches.

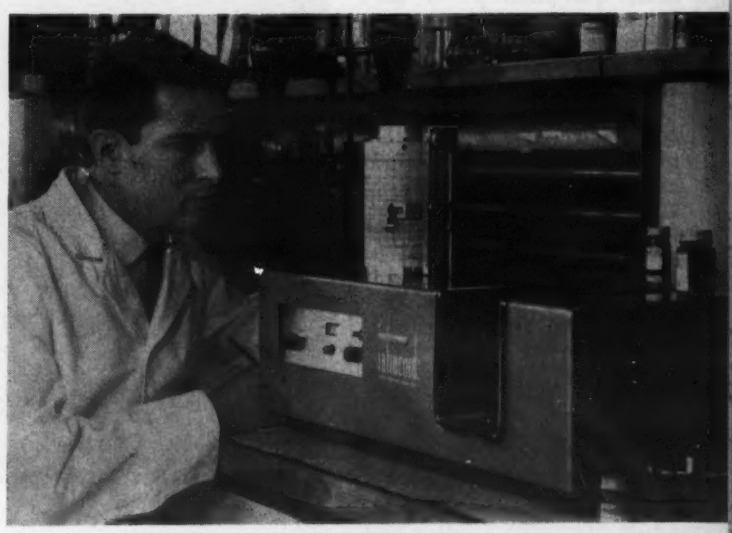
Management at Endo wanted a method of analysis that would be faster and have equal or improved accuracy.

Solution: Lab installed a small, compact, inexpensive (less than $5000) infrared spectrophotometer to expedite analyses. Simple-to-operate unit requires no background in spectrophotometry and is less complicated to use than an analytical balance. Instrument scans spectral range from 2.5 to 15.0 microns.

Simplicity of operation requires only that a piece of chart paper be placed on drum, sample inserted, and start button pressed. Unattended instrument will then record a permanent record on 8½ by 11" notebook paper. Multiple curves can be recorded on a single chart.

Recorder drum synchronizes with any wavelength position, being directly coupled to wavelength cam, and automatically positions itself at starting point. Instrument stops at 15 microns; no run-back time is required. Drum is turned back manually to starting position or any wavelength of interest.

Infrared spectrophotometer is based on fact that molecules absorb infrared radiation at characteristic frequencies. In the double-beam unit, radiation source is split into two components or beams. One beam passes through sample



Coumadin, anti-coagulant, is checked for product purity and assay. Low-cost, easy-to-use spectrophotometer speeds approval of drugs at Endo Laboratories and helps "guarantee" labels

and is then optically compared to reference beam portion not passing through the sample. (For full details on optical system see CHEMICAL PROCESSING, March 1957, page 158.)

A thermocouple detects differences in energy. Unequal signal at this detector is converted to alternating voltage and amplified. This voltage is used to change reference-beam intensity (with an optical wedge) to equal sample beam. Since recorder pen is coupled directly to wedge, degree of transmittance is automatically traced on rotating drum.

Results: Infrared instrument provides an accurate spectrum and purity check of even most complicated compounds with significant savings in manpower and time.

Half-hour Analysis

For example, in assaying Endo's analgesic preparations (Percodan tablets and Percobarb capsules, complicated mixtures of narcotic alkaloids, sedatives, and other drugs), conventional wet methods made it necessary to devote two-and-a-half to three days to complete analysis. Determination can now be made in 25-30 minutes and a double check, if needed, can be made in less than one hour.

It is necessary only to separate out the alkaloids and determine remaining components quantitatively on the instrument.

Presence of impurities in raw materials is quickly revealed.

While wet methods are still often an effective way to determine a single characteristic group in a drug, infrared gives a whole mass of information about a mixture in one spectrum. Because finished products can be analyzed quickly and with accuracy, batches are approved and packaged without delay. Production has been speeded.

(Infracord Model 137 spectrophotometer is a product of Perkin-Elmer Corporation, Norwalk, Conn.)

Check 1177 opposite last page.

Photos by Robert Yarnall Richie

Designed, engineered and constructed by The Lummus Company, this giant petrochemical complex at Lake Charles, La., has three separate control rooms. The compressor and boiler unit is controlled by 38 Microsen control loops. 141 other loops measure variables to control ethylene processing, and 75 more control the ethylene oxide-glycol unit. Kybernetes data read-out equipment is integrated with Microsen instruments in one of the control rooms.

Over 250 Microsen® loops automate processes at Petroleum Chemicals, Inc. and Calcasieu Chemical Corp.

Microsen Electronic Process Instrumentation measures and controls temperature, pressure, flow, and liquid level in this new $80,000,000 installation. Microsen, the DC control system pioneered by Manning, Maxwell & Moore, Inc., was selected for quality of control and ease of installation.

Standard Microsen instruments are used in cascading. By adding ratio amplification in the output of master Controllers, special variable cascade units are created.

The process boiler installation is unique in the use of electronic instrumentation to control both air and gas supply. A special bipolar accelerating amplifier provides zero output under stable process conditions for the three-element feed-water boiler controls.

If a process upset occurs, the amplifier increases output in the indicated direction to correct the deviation. Amplifier output then decays to zero. Decay time is continuously adjustable within a range of .05 to 5.0 seconds.

Field wiring from Transmitters and Valve Positioners is carried in explosion-proof conduit which terminates in ducts at the rear of the panels in each control room. Wiring from ducts to panel instruments is covered with flexible rubber.

Microsen Electronic Process Controls assure permanent savings. They instantly transmit accurate measurements over long distances – assure process stability and efficiency. The DC signal (1.0 to 5.0 ma) is compatible with practically all data handling, telemetering and computing systems, and with process stream analyzers being developed. Microsen design flexibility anticipates ever-changing needs in process control.

Be certain of closer process control. Step up product quality and quantity. For new plant, new process or revamped old process, automate with the Microsen Electronic System. Learn how profitable it can be. Write for information or call in one of our sales engineers.

MICROSEN ELECTRONIC CONTROLS

A product of

MANNING, MAXWELL & MOORE, INC.

Consolidated Ashcroft Hancock Division • Stratford, Connecticut
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

Check 1178 opposite last page

Close, stable temperature control provided

Plug-in circuitry expedites servicing of unit

Uses: On-off temperature control in 200-1000°F range.

Features: Temperatures can be controlled to ±3°F. Optional anticipating section provides control to ±1°F. Plug-in circuitry permits rapid in-plant servicing by non-technical personnel.

Description: Controller automatically turns heat on or off to maintain temperature at desired set point. Plug-in, epoxy-potted circuits are dust- and moisture-proof.

Dimensions are 8 x 5 x 7". Operates on 115v, 60 cy; internal relay controls are 115v, 5 amp. Standard sensing elements are encased in stainless steel tubing, 3/16" diameter, 4½" long, with 2' leads.

(Electrol Unichannel on-off temperature controller is a product of Electronic Processes Corporation of California, 2190 Folsom Street, San Francisco 10, California.)

Check 1179 opposite last page.

Line-metering feed pump has incremental injection

Uses: Continuous-process applications requiring slug rather than continuous feed.

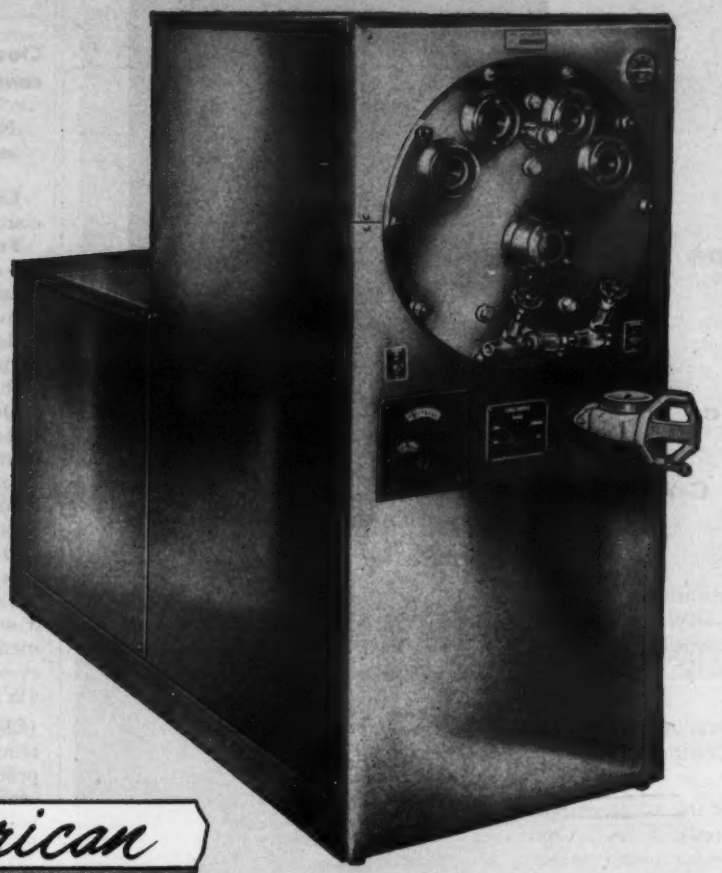
Features: Metering pump has incremental action. Entire cylinder contents are forced into pipeline or vessels at variable rate which depends on spring-pressure adjustment.

Description: Ram withdraws from feed cylinder under slight negative pressure. Thus results in agitation of feed media upon withdrawal of ram from cylinder, thus preventing phase separation.

Location of packing gland on low-pressure side eliminates high-pressure packing problems. Variety of materials and capacities are available.

(Pipeline metering feed pump is product of Sigmamotor, Inc., 18 N. Main St., Middleport, N.Y.)

Check 1180 opposite last page.



American BIOGEN for CONTINUOUS CULTURE OF MICROORGANISMS . . . IN LARGE QUANTITIES

● Biogen is a completely new apparatus which produces extremely large quantities of specific microorganisms quickly, economically and continuously, under well defined conditions.

For the first time, vastly increased investigations requiring large populations of microbial cells become fully practical in such diverse fields as Bacterial Physiology, Enzymology, Genetics, Pharmacology, Fermentation Studies, and Virology (including Bacteriophage).

The Biogen is self-sterilizing and has complete controls on the front panel which govern the sterilization cycle, rotation of the multi-finned agitator and the temperature within the chamber. Chamber temperature is maintained at ±½° C. within a range of 20° C. to 85° C. A filtered air intake provides sterile aeration of the medium within the chamber.

In a recent typical run, with *E. coli B* employing 1% glucose as the limiting growth factor, a maximum population of 1.68×10^{10}/ml. was attained. In 10 hours, on a continuous process, at a flow rate of 10 liters/hour, 14 grams/liter of wet weight cells were harvested. Total yield for the 10-hour run: 1400 grams.

Write for technical literature . . . Bulletin IC-605

AMSCO AMERICAN STERILIZER
ERIE • PENNSYLVANIA

World's largest designer and manufacturer of Sterilizers and Equipment for Biological Research

Check 1181 opposite last page

Pipet-tip drops are eliminated

Uses: Streaking pipet for setting up paper chromatograms.

Features: Design eliminates drop formation at tip of pipet and maintains constant hydrostatic head during delivery of entire sample.

Description: Pipet is designed particularly for use with automatic sample applicator but also can be used to advantage in manual application of samples. Approximately 0.3 ml may be applied by pipet with one filling.

(Chromatography streaking pipet is product of Research Specialties Co., 200 S. Garrard Blvd., Richmond, Calif.)

Check 1182 opposite last page.

Controlled-volume pump helps Hooker meter acid accurately

Used in two-stage chlorine drying system

Problem: The Tacoma, Washington, plant of Hooker Chemical Co. had to find a method for accurate metering of acid for a two-stage chlorine drying system. A balance had to be maintained between the more highly concentrated sulfuric acid introduced and recirculated acid. Thus, concentrated acid had to be metered into system in a precise ratio to flow of acid and chlorine.

Operator changes capacity of sulfuric acid feed to chlorine drying process by turning stroke adjustment dial

Solution: Hooker installed a corrosion-resistant controlled volume pump with a maxi-

mum capacity of 52 gph at a discharge pressure of 35 psi. Unit has cast steel liquid end and ceramic plunger. To vary quantities of acid going to system, pump has a stroke adjustment dial. Capacity can be adjusted while pump is operating.

Results: Controlled-volume pump has provided accurate and continuous acid feed during the four years it has been in use at Hooker. Only routine maintenance has been required.

(Controlled-volume pump is product of Milton Roy Co., 1300 E. Mermaid Lane, Philadelphia 18, Pa.)

Check 1183 opposite last page.

High-precision pressure readings up to 500 psi with Bourdon gage

Accuracy better than 0.2% of full-scale range

Uses: Measurement of absolute, differential, and gage pressures up to 500 psi.

Features: Accuracy is better than 0.2% of full-scale range, with precision readings up to 500 psi.

Description: Gages indicate pressures with liquid-column accuracy. Backlash is eliminated by a nylon thread construction, maintaining uniform tension for all positions of rack and pinion.

Gages consist of two Ni-Span C Bourdon tubes connected to indicating mechanism. These tubes give gages temperature-stability and corrosion resistance.

(Bourdon tube gages, Series A752100 (absolute pressure), A753100 (gage pressure), and A753500 (differential pressure), are products of Wallace & Tiernan Incorporated, 25 Main Street, Belleville 9, New Jersey.)

Check 1184 opposite last page.

Sight flow indicators are outlined in Sight-flow-indicator Data Unit —Jerguson Gage & Valve Company, 100 Adams St., Burlington, Mass.

Check 1185 opposite last page.

EC&M *Fuseless* AIR-BREAK STARTER GIVES Certified 100/150 MVA FAULT PROTECTION

NO SINGLE PHASING FROM BLOWN FUSES!

NO COSTLY REPLACEMENT FUSES TO STOCK!

✓ Gang-operated Disconnect Switches Grounded for Safety in Open Position. Mechanically Interlocked with Contactor... Never Open Under Load

✓ No Fuses. Bus Bars Throughout

✓ 3-way Door Interlock. On, Off and Open—with Positive Interlocking between Door, Disconnect and Contactor for Maximum Personnel Protection

✓ Heavy-duty DC Operating Magnet. No Chatter—No Hum

FRONT ACCESSIBLE WITHOUT ROLL-OUT!

Phase barrier and arc-chutes slide out. All starter parts exposed and accessible for easy inspection and maintenance

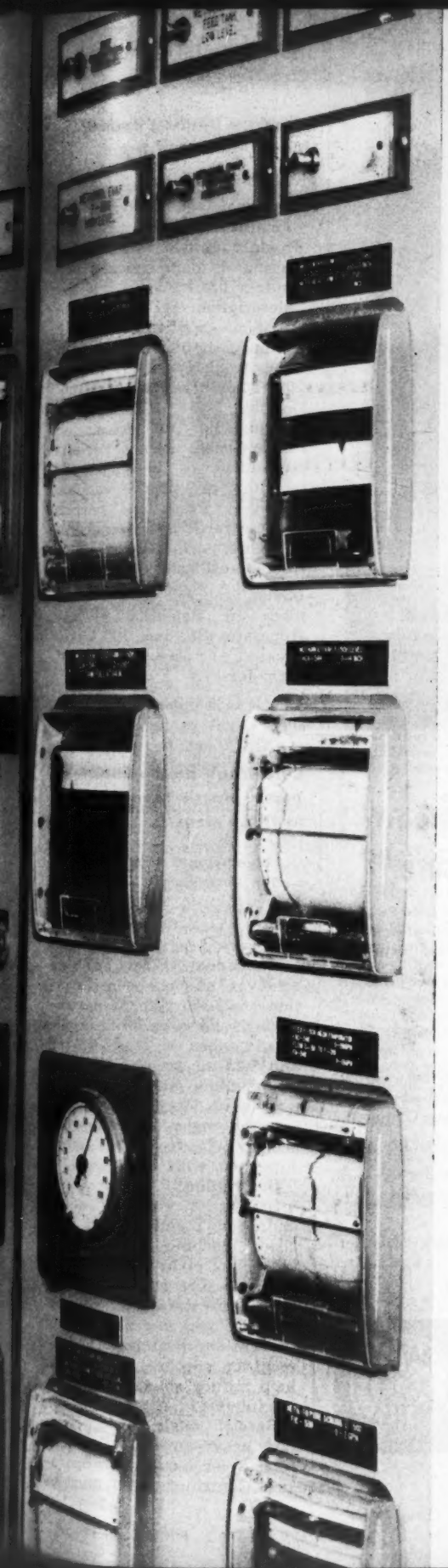
Get the complete story on certified fuseless fault protection for high-voltage motor drives. Write for Bulletin 8130A

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO

2635

Check 1186 opposite last page

Foxboro Pneumatic Consotrol Control Panel at Hercules Powder Company, Burlington, N. J. This Foxboro panel is arranged in a 180° arc so operators can spot warning lights from any position. Continuous air purge in control room eliminates need for explosion-proof electrical switches, alarms, and signal lights.



Hercules Powder Company reports:

175 Pneumatic Consotrols* on stream three years

"—*not a single unscheduled shutdown*"

At the Hercules plant in Burlington, New Jersey, they're producing millions of pounds of di-methyl teraphthalate a year. Foxboro Pneumatic Consotrol indicators, recorders and controllers provide the instrumentation for the entire multi-million dollar plant.

Hercules operators find their Consotrol instruments perfect for the job. They like the ± 1% accuracy of control they get. What's more, they're able to service an M/58 Consotrol Controller—even to a complete disassembly—and have it back in operation in just a few minutes. And they can convert a Consotrol indicator to a recorder by simply inserting a chart drive mechanism.

Get the full story on these low-maintenance, accurate Consotrol Recorder-Controllers before you design your next control system. Write for Bulletin 13-18—it has all the details. **The Foxboro Company, 814 Neponset Ave., Foxboro, Mass.**

*Reg. U.S. Pat. Off.

FOXBORO
REG. U.S. PAT. OFF.

pneumatic Consotrol instrumentation

For more information on product at left, specify 1187 see information request blank opposite last page.

Bailey f/b-*LINE* Differential Pressure Transmitter (Force Balance Mechanism)

Bailey f/b-*LINE* Flow Transmitter (Force Balance Mechanism)

Two new Bailey *f/b-LINE* Transmitters

permit new accuracy in measuring flow and differential pressure

Pneumatically transmits rate of flow—or differential pressure—measurements to indicating, recording, and/or controlling equipment at remote stations. Transmitters consist of a diaphragm measuring mechanism and a force balance pneumatic transmitting unit.

APPLICATION

For steam, water, air, gases and other fluids producing differentials across primary elements from 0-2 in. H_2O to 0-2000 in. H_2O at maximum service pressure of 50, 1500, and 5000 psig.

FEATURES

Transmits a Signal Directly Proportional to Rate of Flow. Uses receiver with uniformly-graduated chart or scale. Eliminates need for external square-root extractors or characterizers.

10 to 1 Turndown. Differential range of each diaphragm measuring element may be changed by factor of 10 to 1; e.g., 0-20 in. H_2O diaphragm may also measure 0-2 in. H_2O.

Screwdriver Adjustments. Range and zero adjustments readily accessible. Range may be changed with screwdriver adjustment.

Overpressure Protection. Protects against full service pressure applied to either side of diaphragm.

Fast Response. No viscous dampers needed, so speed of response is very fast.

Corrosion Resistant. For maximum differentials between 20 and 2000" H_2O, all parts in contact with process fluid may be stainless steel. No sealing fluids or sealing diaphragm required.

Good Stability. Reset type boosters give good stability with high gain.

Versatile Mounting. May be mounted on process piping, wall, or separate mounting pipe using same bracket.

For additional information, call your local Bailey District Office, or write direct.

CP4-1

Chemical and petroleum division

BAILEY METER COMPANY

1074 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal

Check 1188 opposite last page

Stopcock binding ended by exaggerated taper

Uses: On lab ware used in pressure or vacuum operation.

Features: Exaggerated taper of plug eliminates binding and freezing. It neither leaks nor requires lubrication.

Description: Special compound is applied to finely ground glass barrel. It is then fused at high temperature to form smooth bearing for Teflon plug.

Adjustable nut acting on stainless-steel spring permits adjustment to ideal tension for either pressure or vacuum operation. Plugs and barrels in line are interchangeable and glass parts are fabricated from borosilicate glass.

(Gyco stopcock is on ware made by Scientific Glass Apparatus Co., Inc., 100 Lakewood Terrace, Bloomfield, New Jersey.)

Check 1189 opposite last page.

Centrifuge accommodates glass, plastic tubes in three sizes

Polyethylene adapters give unit versatility

Uses: Designed for microchemistry determinations.

Features: Centrifuge achieves efficient centrifugation at 13,500 rpm. It accommodates glass and disposable plastic tubes of 1-ml, 0.5-ml, and 0.25-ml sizes. Versatility in handling tubes of three sizes is made possible by two sets of eight specially designed polyethylene adapters, furnished with each unit.

Description: Unique shock-mounting of housing, motor, and head, together with precision machining and perfect balance of eight-place head, is said to assure quiet operation.

Separate ventilating systems for head and motor chambers prevent overheating of instrument or specimens, and also help reduce sound of unit to a minimum.

Special angle head cover and heavy-gage steel centrifuge cover assure safe operation. Centrifuge cover must be

secured before motor will start.

A dial timer is set for one to 30 minutes, after which an automatic brake stops head without action on technician's or operator's part. Gradual stopping over 60 seconds prevents sediment from becoming disturbed.

(Adams micro-chemistry centrifuge is development of Clay-Adams, Inc., 141 East 25th St., New York 10, N.Y.)

Check 1190 opposite last page.

Repeating flash testing system is fully automatic

Testing results within ±2°F of manual operation

Uses: Flash test provides close, prompt watch over fractionators for quicker start-up and better control while running. Also assures safety in product pipeline operations of tanker or tank-car loading.

Features: Continuous flash-point recorder automatically samples from stream to which it is piped. Results correlate with manually performed ASTM D-56 within ±2°F.

Description: Results are recorded continuously at approximately three-minute intervals. Range covered is from 80 to 190°F. Instrument requires no operating attention and minimum of maintenance and calibration.

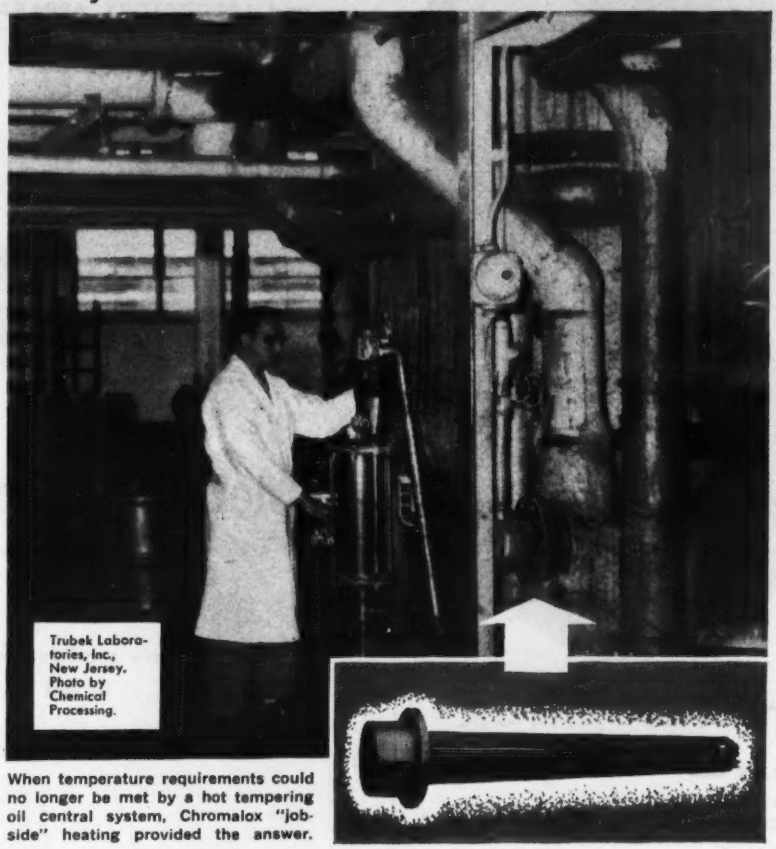
Except for recorder (which can be remotely located), instrument is safe for use in Class I, Group D hazardous locations.

(Continuous flash-point recorder is a product of Precision Scientific Co., 3737 West Cortland Street, Chicago 47, Illinois.)

Check 1191 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Call your Chromalox Man for answers to . . .



When temperature requirements could no longer be met by a hot tempering oil central system, Chromalox "job-side" heating provided the answer.

Widely different temperature requirements on various processing vessels

Recently, this New Jersey company converted an old hot oil central system to Chromalox electric "job-side" heating. In addition to being troublesome, the old system could not provide the variety of temperatures required for their growing diversity of products. Switching to Chromalox Immersion Heaters, they now use Aroclors and Dowtherm as heat transfer media. On one 350-gallon vacuum still, 18kw of heat capacity now provides temperatures of 290°C. Chromalox Type TMO Immersion Heaters operate in the bottom of the vented vessel jacket which contains the heat transfer medium. Using 30kw, a 450-gallon sealed jacket reactor can attain 325°C, using Dowtherm-A.

Since some vessels had previously been equipped with steam coils or were glass-lined, insertion of heaters into the vessel or jacket was impractical. Instead, transfer media is heated adjacent to the vessel and circulated by sump-type centrifugal pump.

Perhaps your Chromalox Man, listed at the right, can help you solve some of *your* heating problems the easy, economical, *electrical* way. Why not give him a call for . . . *Faster heating* of water, oils, Dowtherm, Prestone. *Faster melting* of grease, asphalt, solder, babbitt. *Faster superheating* of steam, compressed air. 7754

CHROMALOX has a complete line of electric heaters to meet all your liquid processing requirements:

Call Chromalox for the man with the Electrical Answers to your heating problems

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Mohawk 4-6113
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EXPORT DEPARTMENT
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Check 1192 opposite last page

15-to-1 Turn Down with Uniform Accuracy

NEW

Kates

TYPE "F"

FLOW RATE REGULATOR

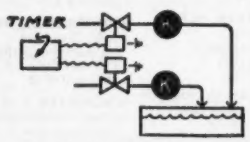
NEW IMPROVED DESIGN

MORE ACCURATE —
Both in flow control and set point adjustment

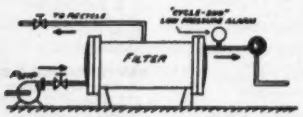
MORE ADAPTABLE —
For a wider variety of liquids and applications

MORE FLEXIBLE —
With 15 to 1 turn down

TYPICAL APPLICATIONS



Batch process measurement



Pressure filtration control

A 15-to-1 "turndown" with a twist of a dial is now possible with the all-new, improved TYPE "F" Regulator — a *direct-acting, self-contained* unit that automatically measures and controls fluid-flow regardless of variations in supply or discharge pressures. Quickly and easily installed, it *performs all the functions of a complete fluid-flow control system.* Set the desired flow rate on the direct reading, uniformly graduated 160° dial... then forget it! The TYPE "F" Regulator does the rest. Kates TYPE "F" Regulators offer greater accuracy, handle a wider range of liquids with greater stability, yet faster response than ever before! Economical — their ultra-simple design, rugged construction features mean longer life, less service needs. Standard units are rated from 0.02-0.20 to 100-550 GPM. Special units can be supplied for unique applications.

Get full details and description— write for New Bulletin No. 581

DON'T BUILD A SYSTEM —

INSTALL A Kates

THE W. A. KATES COMPANY
Department O
430 Waukegan Road
Deerfield, Illinois

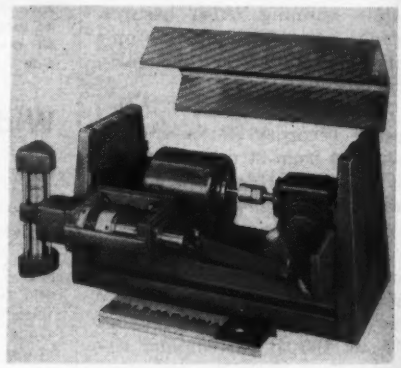
Check 1193 opposite last page

PROCESS INSTRUMENTATION and LABORATORY APPARATUS

Streamlined shield on pump is functional as well as good looking

Metering pumps designed for easy servicing

Four models handle from fraction of gal to 1030 gal/hr



Pump components are neatly and compactly arranged, resulting in easy, quick maintenance

Uses: Accurately metering various fluids in chemical, petroleum, textile, and allied industries.

Features: Pumps are designed for accuracy, economy, and minimum maintenance. Compact and attractive, line can handle from as little as fraction of a gal to as much as 1030 gal/hr.

Description: Pumps are available in four different sizes and various materials of construction. Each model is covered by a streamlined safety shield. All parts are readily interchangeable among same size units, simplifying maintenance and cutting replacement-part inventories.

Check-valve assembly is designed to insure greatest hydraulic efficiency. Valve features straight-through flow for smooth, accurate performance. Complete check-valve assembly is replaceable on pump body.

Self-aligning pump body is easily and quickly removed from mountings. Body has lantern rings for water wash connections. Improved V-type packing minimizes stuffing-box maintenance and adds to packing life. Throat and follower bushings are removable and interchangeable with one another.

Simplified crank-type drive reduces wear on plunger guide bushing At full stroke, angularity of connecting rod is but 9° from axis of plunger, minimizing eccentric load. Needle bearings are used on all rotary connections.

Pumps are powered by standard NEMA foot-mounted motors. Speed reducers are separate from motors, simplifying inventories and replacement.

Optional Features

Pumps can be serviced with conventional, everyday tools. Adjustments, resetting, or parts replacements are performed quickly and easily. Manual and automatic "in motion" stroke adjustment is available as optional equipment. Other optional features include multiple feeds, pneumatic drives, variable-speed drives, and automatic and remote controls.

Smallest pump, Model 20, has capacity ranging from 0.92 to 67.0 gal/hr. Plunger sizes vary from ¼ to 1⅜" diam. Maximum discharge pressure at lowest flow rate and with ¼-hp motor is 1270 psi. Pressure at highest flow with same size motor is 42 psi.

Largest unit is Model 50. It is available with either single or double feed. Plunger diam ranges from ⅞ to 3½". Minimum and maximum capacity for single-feed unit is 28.5 and 1030 gal/hr. Double-feed model can handle minimum of 57 and maximum of 1960 gal/hr. Discharge pressure when fitted with 5-hp motor varies from 3500 to 54 psi, depending on flow rate.

Construction Materials

Standard materials of construction for pump bodies and liquid-end parts are cast iron, 316 stainless, cast steel, or Durimet. Plungers are available surfaced with either steel-hardened hard chrome or Type 440 stainless steel. Plungers are also available in Hastelloy D at additional cost.

Cast-iron construction is limited to maximum pressure

So many ways the *FISHER/MAN*
can give you a helping hand with the

WIZARD II
PRESSURE CONTROLLERS

- Two Position Controller
- Proportional Controller
- Proportional Controller —Remote Set
- Differential Proportional Controller
- Pressure Transmitter
- Differential Proportional Controller— Remote Set
- Proportional Reset Controller
- Differential Proportional Reset

This "Jack of ALL Trades" is surprisingly low in cost

The partial list of applications at left tells you why the Wizard II is so aptly named. Probably no other controller in the Fisher line is as versatile. Available in brass, steel or stainless steel Bourdon tubes for ranges from 25 to 10,000 psi. Brass or stainless steel bellows available for low pressure service from 30" Hg Vacuum to 30 psi.

Fisher has carefully designed each component of the new Wizard to satisfy the most rigid process control requirements. A completely descriptive and illustrated booklet on the Wizard II is yours for the asking. Write for Bulletin D 4150 A.

IF IT FLOWS THROUGH PIPE ANYWHERE IN THE WORLD . . . CHANCES ARE IT'S CONTROLLED BY . . .

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Marshalltown, Iowa / Woodstock, Ontario / London, England

CONTINENTAL EQUIPMENT CO. DIVISION, Coraopolis, Pennsylvania

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SINCE 1880

Check 1194 opposite last page

Rated "Exceptional"

...BY ONE OF THE WORLD'S LEADING OIL COMPANIES

An internationally famous oil company recently carried out exhaustive tests on the Taylor 90J TRANSCOPE* Recorder. This particular company is continually testing and evaluating instruments from all over the world.

In the opinion of the qualified specialists of this world-famous company, the performance of the 90J Recorder was outstanding. In fact they were so impressed that they established a *new classification* . . . they rated it "exceptional".

Experience with this instrument has inspired the statement, "No other recorder puts so many features in so little panel space". And it's so easy to prove — make arrangements with your Taylor Field Engineer — to put a 90J TRANSCOPE Recorder on test. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Ontario.

*Reg. U.S. Pat. Off.

Look to Taylor for **VISION . . . INGENUITY . . . DEPENDABILITY**

Taylor Instruments MEAN ACCURACY FIRST

Check 1195 opposite last page

of 1000 psi. Cast steel is recommended by manufacturer above this pressure. At 1000 psi, maximum temperature for cast iron construction is 250°F. For temperatures higher than this, but below 1000 psi, either cast steel or higher alloys are recommended, depending upon service.

(Further information about Masterline metering pumps may be obtained from Hills-McCanna Company, 4600 W. Touhy Ave., Chicago 46, Ill.)

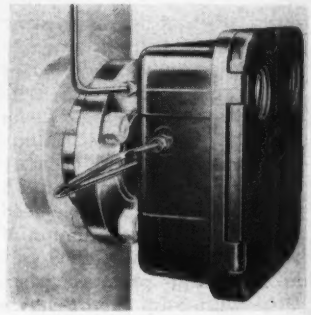
Check 1196 opposite last page.

Floatless level control handles corrosive or heavy liquids

Uses: As liquid level controller for measurements involving corrosive or heavy liquids.

Features: Hard-to-handle liquids come into contact only with diaphragm and diaphragm ring of floatless level controller, eliminating danger of corroded or clogged measurement element.

Description: Instrument transmits a pneumatic output



Liquids contact only diaphragm or end diaphragm ring of level controller

signal equal in magnitude to head pressure resulting from liquid in vessel. When used for level recording and control, a controller is required to convert transmitted output into a standard pneumatic signal for recorder and control valve.

(Type 115 level control is product of Fisher Governor Co., Marshalltown, Iowa.)

Check 1197 opposite last page.

Gas chromatography unit operates up to 300°C with 1 or 2 columns

Column and detector temperature held within 1°C

Uses: Gas chromatography.
Features: Instrument may be operated with one or two columns in the compartment.

Gas chromatograph permits three detectors to be used interchangeably

Compartment temperature may range from room temperature to 300°C. Columns 50 ft and longer can be accommodated. Proportional control circuit insures close regulation and uniformity of column and detector temperature, which is held within 1°C.

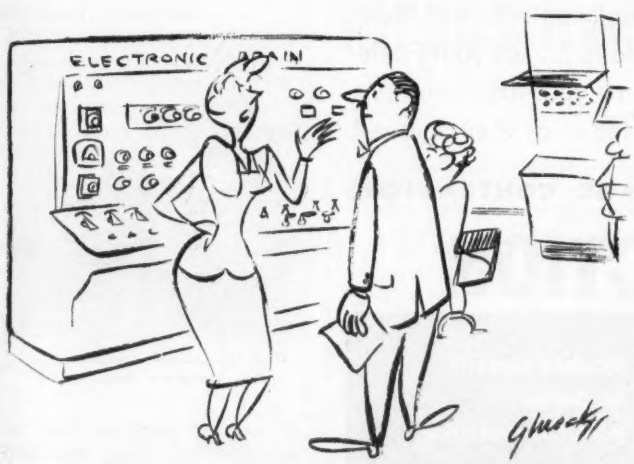
Description: Instrument is easily transportable, measuring 23" wide, 18" deep, and 39" high. Weight is 200 lb. Three detectors may be used interchangeably. Standard equipment includes either filament or thermistor type of thermal conductivity detector. Highly sensitive ionization detector is optional.

Efficient gas sample valve provides high degree of reproducibility of analytical results. Valve is fabricated of stainless steel and Teflon and is non-lubricated. Liquid sample introduction system is of extremely small volume, and is heated and controlled independently.

Attenuator and continuous-type operating data recorder are also included. Former is totally enclosed, has 1 to 1000 range. Latter contains high-resolution slidewire and high-gain amplifier to eliminate "stepping".

(Chromacon series 9580 is product of Podbielniak, Inc., 341 East Ohio Street, Chicago 11, Illinois.)

Check 1198 opposite last page.

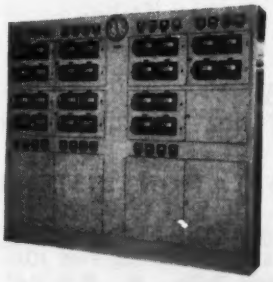


"You mean after plunkin' down all that dough for this machine we're still expected to THINK around here?!"

If temperature is a factor in *any* step of your overall operation, quality of its control can affect *several* steps far more than you might expect. And, from our experience with countless applications that may be considered "satisfactory," control is rarely as good as it can be...

Temperature control can be more precise and consistent. It *can* reduce work-stoppage and rejects. It *can* increase volume and maintain quality. It *can* simplify some steps and materially cut costs.

Use the know-how of our world-wide service force to evaluate your potential in temperature control. Free consultation plus complete selection of instruments to suit your individual situation—Veri-Tell Indicators, Gardsman Controllers, Marksman Recorders, our own Thermocouples and accessories.



Custom Control Systems

Any combination of our instruments, complete with accessories and wiring, is factory-installed in a compact steel cabinet to suit your situation. At the other extreme, we offer a complete selection of our own thermocouples and accessories priced and ready to ship at your convenience. Phone your West consultant (see Yellow pages) or write Chicago office for Bulletin CS or for COM digest-catalog of line.

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Check 1199 opposite last page

OUR BUSINESS IS PROTECTION FOR THERMAL INSULATION

Foster's entire operating organization including research, technical, production, sales and management are engaged in one endeavor only . . . keeping your thermal insulation protected from fire, weather, chemical and physical abuse as well as other forces that can hinder insulation efficiency.

Foster products for thermal insulation protection are backed by fifty years' experience in compounding products for heavy-duty protective use.

Every thought at Foster, every new Foster product, is aimed directly at prolonging the life of your heated and refrigerated insulations. And, therefore, practically every insulation-protection problem you may have—now or in the future—can be answered by some standard Foster protective system.

Consult Foster and use the finest products known for thermal insulation protection. Save . . . many times over . . . the wasteful cost of frequent repair and replacement. For literature relating to your needs . . . see your Foster Sales Engineer or outline your insulation protection problem in a letter or a phone call.

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standard products for thermal insulation protection

Check 1200 opposite last page

Any material is ground to required graduation

Uses: Grinding of materials for analysis.

Features: Motor-driven mortar and pestle grinds materials to any desired graduation.

Description: Components are both made from hard grade of porcelain, for grinding materials such as coal, quartzite, clinker, glass, and fireclay.

For grinding harder substances, mortars and pestles of three other materials are available: abrasion-resistant steel, agate, and sintered corundum (100% Al_2O_3).

Mortar is driven by motor turntable. It is easily detached and engaged without clamping or adjustment. Pestle head assembly can be tilted away from mortar with one movement.

(Electric mortar grinder is product of The Torsion Balance Company, Clifton, N.J.)

Check 1201 opposite last page.

Variables of liquid storage, transportation measured and logged

Uses: For measuring and logging variables associated with storage and transportation of liquids. Also in logging status of various operating equipment such as valves and pump motors.

Features: Almost any type of logging program can be arranged by using standard sub-assemblies to form complete system.

Desk-top control console operates complete data system

Description: Variables such as liquid level, temperature, pressure, and positive-displacement-meter readings are handled. Time, data, and identification points can be recorded as needed.

Smallest capacity unit will handle 48 points. For larger capacities, number of points is usually increased in multiples of 48. Data-printer unit is IBM input writer, but other printers can be provided.

Complete system may be operated from small control console or may be built into central control unit which contains scanning, programming, data-translation units, power supplies, and control units.

(Pulse code data gathering and reduction system is a product of The Vapor Recovery Systems Company, 2820 North Alameda, Compton, California.)

Check 1202 opposite last page.

NEXT MONTH

Quick, accurate analysis of raw material and process streams helps maintain production efficiency at Petroleum Chemicals, Inc. Gas chromatographs are the key and the story is next month's feature in this section.

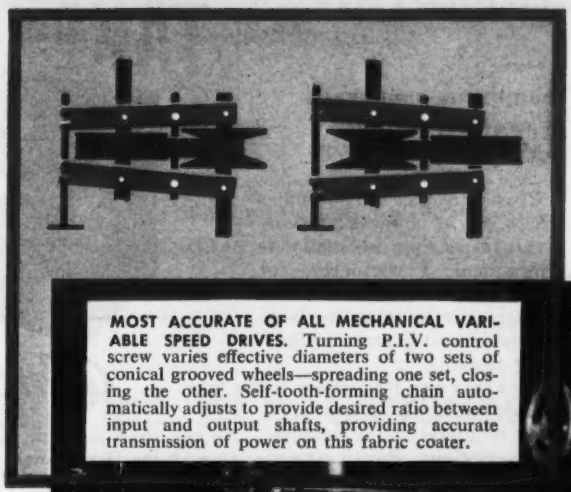
Teflon lab containers are heat resistant

Laboratory-container line of Teflon is reported to be heat resistant, completely noncontaminating, and unbreakable. Line includes full range of beakers, stirring rods, watch glasses, and evaporating dishes.

Beakers of line have maintained stability when filled with molten high-density lead alloy and heated to 600°F for 24 hours. Containers are nonwettable and inert to corrosive reagents.

(Chemware laboratory ware is product of Chemplast, Inc., 3 Central Ave., East Newark, New Jersey.)

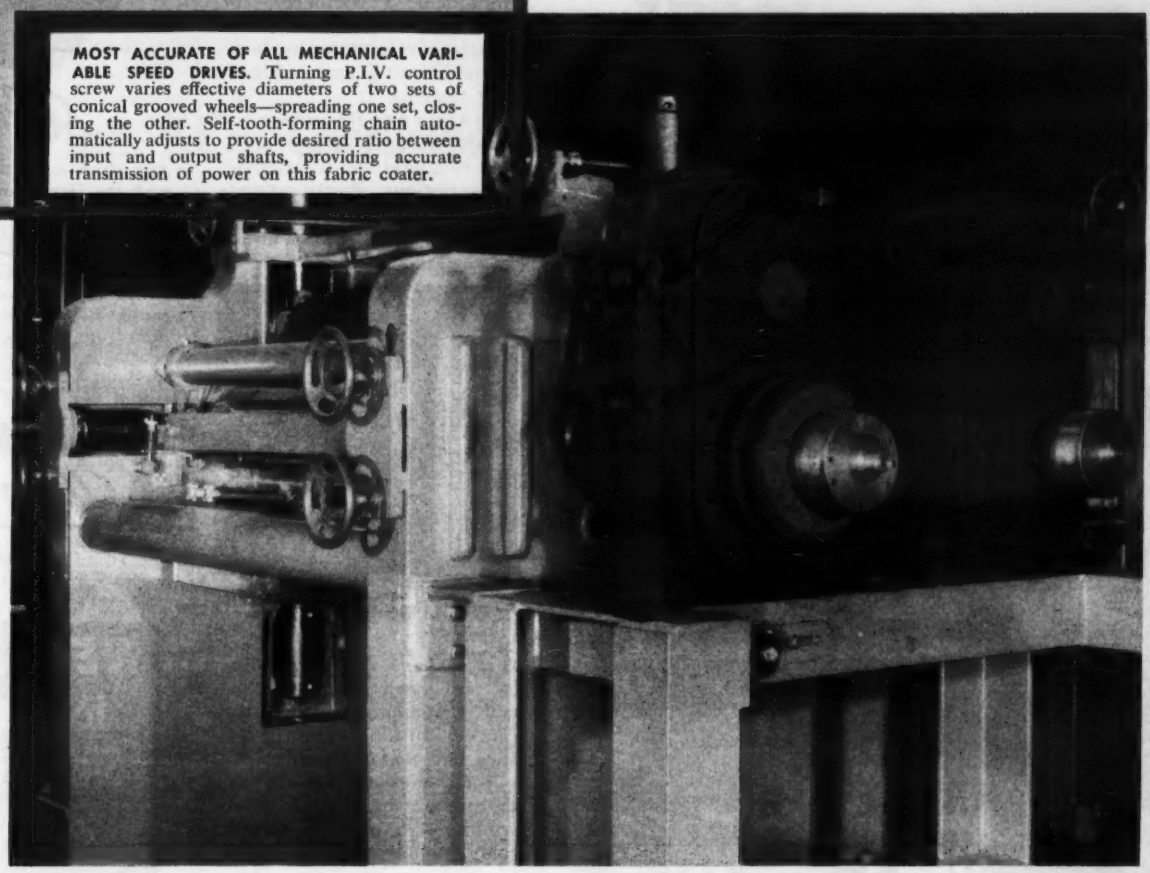
Check 1203 opposite last page.



In principle . . .

in performance . . .

MOST ACCURATE OF ALL MECHANICAL VARIABLE SPEED DRIVES. Turning P.I.V. control screw varies effective diameters of two sets of conical grooved wheels—spreading one set, closing the other. Self-tooth-forming chain automatically adjusts to provide desired ratio between input and output shafts, providing accurate transmission of power on this fabric coater.



for positive, infinitely variable speed control

. . . there's nothing like P.I.V.

Here's a variable speed drive that is truly unique. Unlike conventional designs, Link-Belt P.I.V. with its all-metal chain drive is *not dependent on friction* for transmitting power.

P.I.V. permits fast, easy speed changing too. You can select any speed in its range—find it instantly, hold it indefinitely. No bother stopping the drive.

Because Link-Belt P.I.V. (Positive, Infinitely Variable) drives are fully enclosed, atmospheric conditions can't affect their efficiency. They're made in 8 sizes, 16 standard types. Ask your nearest Link-Belt office or authorized stock-carrying distributor for Book 2274.

LINK-BELT

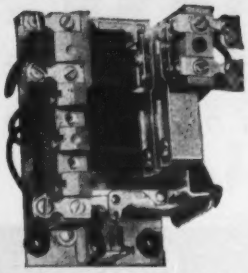
P.I.V. VARIABLE SPEED DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 14,042

Check 1204 opposite last page

LIQUID LEVEL CONTROL

● Accurate! Automatic! No floats! No moving parts in liquid. Pioneered by B/W in 1933. Controls not affected by temperatures, pressures, acids, or caustics. Remote control if desired. Ice free electrodes when necessary.



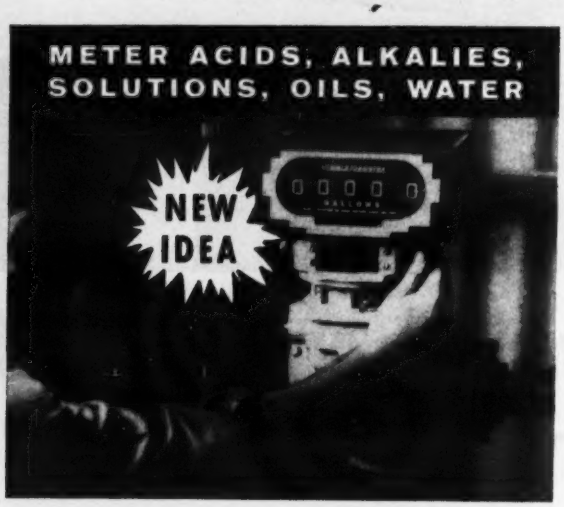
WRITE for NEW
CATALOG

Describes liquid level relays, electrodes, signals, alarms and alternators. Complete descriptions, charts and diagrams. Shows panels for liquid level and industrial controls. Full of valuable information . . . Write, wire or phone.

B/W CONTROLLER CORPORATION

2204 East Maple Road, Birmingham, Michigan

Check 1205 opposite last page



Whatever the liquid, you can meter and save!

The operator, in the photo above, is pre-setting the desired quantity on a Rockwell *stainless steel* meter prior to delivery to the reactor in a polyvinyl production process. The meter mechanism automatically shuts off when the pre-set quantity is reached. It's simple and quick to batch and blend liquids this way . . . and without contamination, fumes or hazards.

Wherever liquids are stored, mixed or consumed you'll be ahead to measure with Rockwell industrial meters. There's a size, type and metal for practically every liquid. Write for Bulletins.

ROCKWELL MANUFACTURING COMPANY, PITTSBURGH 8, PA

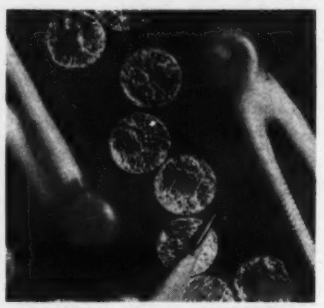
Check 1206 opposite last page

Thermistors employed as over-temperature bodyguards

Uses: As thermal switches when use of bimetallic temperature-sensing elements is impractical. Particularly, for over-temperature protection of hermetic motors in large air-conditioning and refrigerating systems.

Features: Resistance increases abruptly when specified temperature is attained.

Description: Positive-temperature-coefficient thermistors, as opposed to conventional type, have greater sensitivity and more sharply defined and controllable temperature ranges, within which resistance increases abruptly.



Metallized ceramic discs are at heart of switching thermistors

Such characteristics enable thermistors installed in motor windings to operate external relay. Relay de-energizes motor or gives signal when overheating occurs.

Thermistors for this purpose will switch at specific temperatures between 100 and 125°C. They will function in control circuits requiring 17:1 ratio of max to residual resistance.

(Positive-temperature-coefficient thermistors are product of Westinghouse Electric Corporation, Box 2278, Pittsburgh 30, Pa.)

Check 1207 opposite last page.

Natural-gas metering in wide flow ranges is discussed, and wide-range-flow meter and differential-limit controller are described, in Application Data Sheets 783-4 and 783-13. — The Foxboro Company, Foxboro, Mass.

Check 1208 opposite last page.

TAKE GUESSWORK OUT of DEW POINT READING with Alnor® DEWPOINTER

Any shop man can quickly...accurately...read dew points with the Dewpointer. It is the only instrument that lets you see the fog in a sealed chamber under controlled conditions. Compare this fast, positive method with attempts made to tell exactly when fog forms on a mirrored surface. Completely self-contained, requires no external coolant or auxiliary apparatus ...operates on enclosed battery or AC. Available in three ranges for dew points between −20° F. and room temperature, from −80° to 0° F. and −80° F. to room temperature.

Send for Dewpointer bulletin. Tear out this ad and send on your letterhead to: Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.

Alnor PRECISION INSTRUMENTS FOR EVERY INDUSTRY

Check 1209 opposite last page

Here is a new line of Sight Flow Indicators . . easily and inexpensively installed in any new or existing pipe line ½" to 2" N.P.T. The special design results in a turbulence in the flow of liquid, making it easily visible. Several types of indicating vanes may also be furnished, according to variable conditions of rate of flow and viscosity of liquid. For indication of minute flows, small Sight Flow Indicators with a rotating vertical rising ball are available.

Jerguson Sight Flow Indicators are soundly designed, carefully made, and are backed up by a company with over 40 years experience in the field. Available in Transparent and Reflex types, in a wide variety of materials and linings and special constructions.

Investigate the new Jerguson Sight Flow Indicators today. Send us your requirements or write for Data Unit.

JERGUSON — Gages and Valves for the Observation of Liquids and Levels

JERGUSON GAGE & VALVE COMPANY
100 Adams Street, Burlington, Mass.

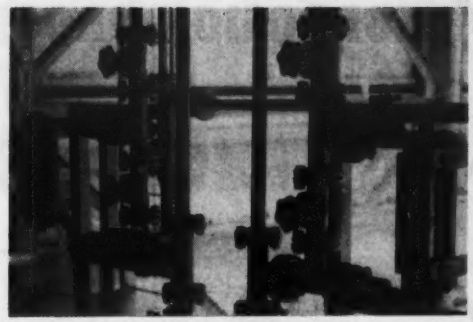
Offices in Major Cities. In Canada: Peacock Bros. Ltd. In England: Jerguson Tress Gage & Valve Co. In France: Pétrole Service

Check 1210 opposite last page

Contamination was threat in piping handling HCl, HF, and H_2SO_4 used in processes to refine tungsten and tantalum. At Fansteel Metallurgical Corporation . . .

Saran Lined Pipe KOs Corrosion, Cuts Downtime, Eases Maintenance

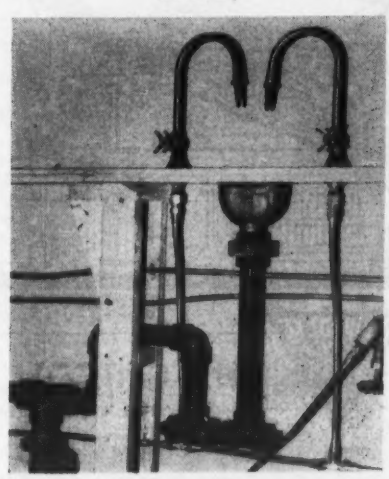
PAUL HOFFMAN, News Editor
with **SAMUEL A. WILSON,** Chemical Engineer
Fansteel Metallurgical Corporation
North Chicago, Ill.



Saran lined steel pipe carrying HF, H_2SO_4, and organic solvents in Fansteel's process to treat tantalite ore. Saran lined, cast iron, flanged diaphragm valves are just to left of rotometer. Solid saran body screwed diaphragm valves are at top and bottom of rotometer

This piece of saran lined pipe shows no effects of corrosion after two years' service at Fansteel

Closeup of saran lined drain pipe in Fansteel's research laboratory



Problem: Corrosion of piping handling highly corrosive materials posed a threat of product contamination in refining tungsten and tantalum at Fansteel Metallurgical Corporation, North Chicago, Illinois.

This also created possibility of developing leakage in the system.

Solution: Saran lined steel pipe was substituted to handle HCl used in one process. It is being used in sizes from 1 to 2½", and has a standard OD Iron Pipe Size dimension with lining varying from 5/32 to 3/16".

Saran pipe and saran lined steel pipe of ½ to 2" IPS was installed as a material of construction for the process using HF and H_2SO_4. Saran lined pipe also was installed in the research laboratory drain system.

Installation of pipe was easy and efficient. Material was cut and threaded on site where needed. The steel jacket of saran lined pipe was cut back 3/16 of an inch to allow the saran liner to protrude this distance. Steel couplings and flanges with special O-ring type gaskets bring tips tightly together, insuring perfect seal. Couplings are unaffected by vibration.

Weight of pipe is such that it does not require special supports. It is sufficiently rigid to keep from bending in lengthy carrys.

In excess of 3000 ft of both lined and straight saran pipe are in use at North Chicago.

Results: Company reports both lined and regular saran pipe have given 100% service. Pipe handling HCl has been in service about five years; that handling HF and H_2SO_4 for over two years, and that used in drain pipe in excess of six months.

Threat of contamination has been minimized because, within temperature limits, pipe has proved resistant to corrosion attack even by the wide variety of reagents.

Downtime has been virtually eliminated in the around-the-clock, seven-day-a-week operation.

Maintenance has been simplified. All that is required is an occasional coat of paint on the steel exterior of pipe, which is subjected to attack by corrosive fumes.

Initial cost of pipe was considerably lower because it could be bought from warehouse stock. Installed cost was less than conventional material of construction which would withstand corrosive conditions encountered.

Pipe carrying HF and H_2SO_4 is equipped with saran lined, cast iron, flanged diaphragm valves and solid saran, body screwed, diaphragm valves. A few of the latter also are in service in the HCl application. Company reports all valves also have given 100% service.

Successful experience at North Chicago impelled Fansteel management to install saran and saran lined pipe at company's new plant at Muskogee, Okla. In excess of 3000 ft of lined pipe is used there in process to produce high-grade tantalum and columbium.

(Saran pipe and saran lined pipe are manufactured by The Dow Chemical Company, Midland, Mich.)

(For further information on saran pipe, saran lined pipe, and saran valves, contact Saran Lined Pipe Company, 2415 Burdette Ave., Ferndale 20, Michigan.)

Check 1211 opposite last page.

This
CORROSION-PROOF FLOOR
was pre-engineered
by **CEILCOTE!**

Ceilcote offers 33 years of technical experience in *engineering* floors. Scientifically applied over new or old concrete, **COROCRETE** monolithic floors are four times stronger than concrete . . . offer maximum resistance to acids and alkalis . . . provide for thermal expansion. Available in finishes ranging from non-skid abrasive to highly polished surfaces, **COROCRETE** withstands impact and thermal shock without spalling or cracking. **COROLINE** is used to cover expansion joints or combined with glass cloth reinforcing to line trenches and pump bases. Write today for complete information on materials and installation services.

COROCRETE CEILCOTE

THE CEILCOTE COMPANY, INC.
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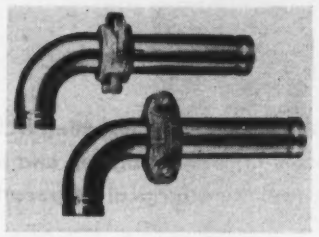
Check 1212 opposite last page



Stainless-steel fittings permit quick-coupled pipe system

Uses: For installation with manufacturer's couplings to make possible complete, quick-coupled, all-stainless-steel pipe system.

Features: Fittings reduce by 50% the cost of joining schedule 5 and 10 stainless-steel pipe, as compared to that of welding or flanging. In addition, plant downtime for pipe cleaning or alteration is reduced.

Description: Coupling utilizes pressure-sensitive gasket that bridges pipe ends. Also incorporated is housing that fits snugly into circumferential grooves in pipe.

Pipe is made tight with two bolts or toggle. Toggle opens or closes by hand in one operation, without tools.

Pipe fittings are made from AISI Types 304 and 304L austenitic 18-8 chromium-nickel stainless alloy.

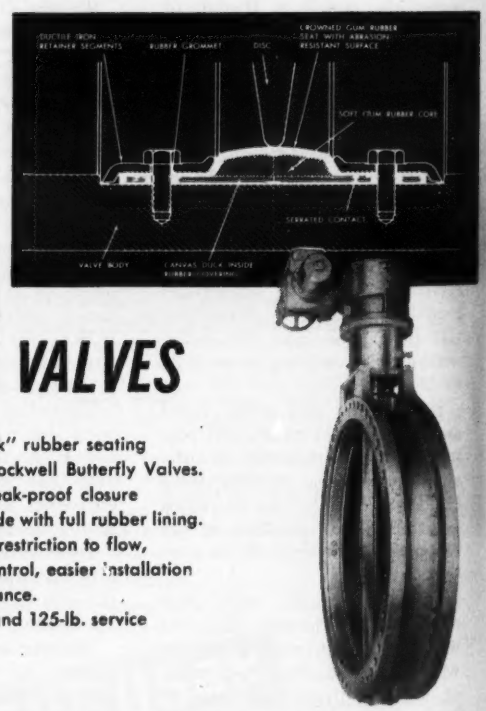
They are also available in 316 and 316L alloy, containing approximately 11% nickel, for systems serving under more severe temperatures and corrosive conditions.

Stainless-steel elbows, tees, crosses, returns, stub and blank ends, reducers, and reducing tees, with roll-grooved ends, are available from stock in sizes that range from 1¼" to 4" in diameter.

(Stainless-steel pipe fittings are product of Victaulic Co. of America, Elizabeth, N.J.)

Check 1213 opposite last page.

DRIP-TIGHT SHUT-OFF *with* **ROCKWELL** ***BUTTERFLY VALVES***



The matchless new "Wedge-Lock" rubber seating provides drip-tight shut-off in Rockwell Butterfly Valves. Its unique construction makes leak-proof closure sure and safe. Valves can be made with full rubber lining.

Other advantages—minimum restriction to flow, positive manual or automatic control, easier installation in less space, minimum maintenance.

Made in all sizes, in 25-, 50- and 125-lb. service in all industrial applications.

Write for Bulletin 582.

ROCKWELL SINCE 1888 BUILT

W. S. ROCKWELL COMPANY
Valves - Butterfly • Slide • Diaphragm • Special
2209 Eliot Street • Fairfield, Conn.

Check 1214 opposite last page

Polymer-lined wood tanks are durable, economical

Wood tanks are now being equipped with polymer linings. Such linings are durable, and yet economical in terms of material and installation labor.

PVC linings are used in handling almost all inorganic acids and bases, bleach, and many organic solvents. Polyethylene linings are for organic solvents and inorganic solutions.

Polymer linings are heat-sealed into a bag liner made to fit inside tank. Fittings are easily connected to tank with liner in place. Under abusive conditions, separate protective lining of boards, plywood, or rigid PVC can be added to inside.

Polymer linings for wood tanks are easily installed

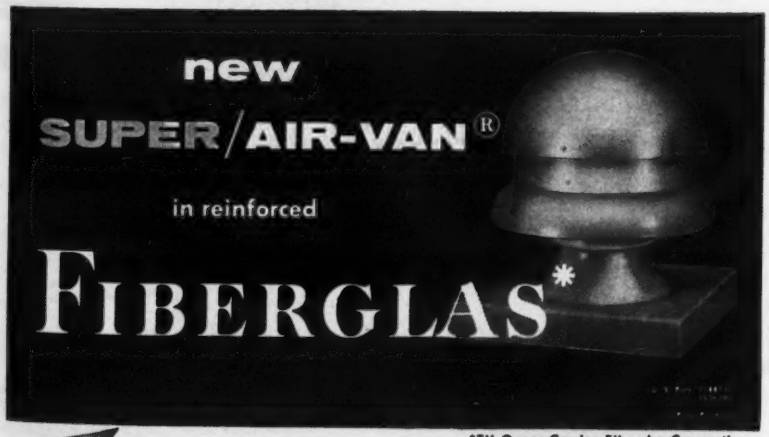
(Polycel tanks are product of Wendnagel & Co., Inc., 600 W. Cermak Rd., Chicago 16, Illinois.)

Check 1215 opposite last page.

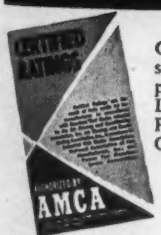
Alloy corrosion resistances are outlined in 40-page booklet which includes charts and graphs showing penetration rates for alloys in over 250 corrosives. "Corrosion Resistance of Haynes Alloys" — Haynes Stellite Co., Division of Union Carbide Corporation, Kokomo, Ind.

Check 1216 opposite last page.

NEW answer to **CORROSION** and **SAFE** fume handling



*TM Owens-Corning Fiberglas Corporation



AMCA Seal does not apply to units with wheels of less than 12" diameter.

Corrosion resistant to moisture laden air, most common inorganic acids, salts, gases, and organic materials. Low maintenance—never requires painting. Motor out of airstream and protected by patented air seal-off. Lightweight, high impact strength. Inherently quiet, sound absorbent. Patented scroll design assures efficiency to 4" S. P. Certified Ratings. Capacities 100-11, 500 CFM.

For full information see your Gallaher representative or write:

GALLAHER

20 Years of Leadership in Power Roof Exhauster Design

The Gallaher Company 4108 Dodge St. Omaha, Nebraska

Check 1217 opposite last page

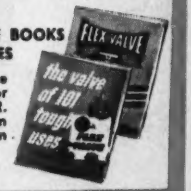
THE "JOB PROVED" ANSWER TO PLUGGED UP VALVES in CORROSIVE and ABRASIVE SERVICE

- Non-clogging
- Corrosion-resistant
- Full pipe capacity
- Absorbs vibration
- Low replacement costs
- No freeze-up in outdoor service
- No obstructions, pockets or internal parts
- Tight on grits to ⅛"
- Maintenance free

Case histories show batteries of Farris FLEX VALVES in severe corrosive and abrasive service for more than 25 years — far surpassing metal valves in efficiency and reliability. FLEX VALVE is the original pinch-type valve, built by Farris to meet industry's need for *tough* service. FLEX VALVE, in effect, is an integral part of your process piping. Clean FLEX VALVE when pipes are cleaned — the same way! Whether your material is corrosive chemicals, solids in suspension or even wet cement... FLEX VALVE cannot plug! Wide choice of flexible valve bodies for every process need. Manual or motor-operated types and Metal enclosed SuperSeal designs for higher pressures, hazardous service.

FREE TWO VALUABLE BOOKS ON FLEX VALVES

Complete catalog data on the FLEX VALVE line is yours for the asking. Request FL-1116R. Hundreds of uses are listed in FL-935. Also available on request.



GUARANTEED NOT TO PLUG OR YOUR MONEY BACK!

PROGRESS THROUGH Farris HONEST PURPOSE

Over 25 Years in Industry's Toughest Service

FLEXIBLE VALVE CORP.

505 COMMERCIAL AVENUE, PALISADES PARK, N. J.

TEXAS FACTORY: 5405 CLINTON DRIVE, HOUSTON 20.

AFFILIATES: FARRIS ENGINEERING CORP • FARRIS PICKERING GOVERNOR CO., INC. • FARRIS ENGINEERING, LTD. (England)

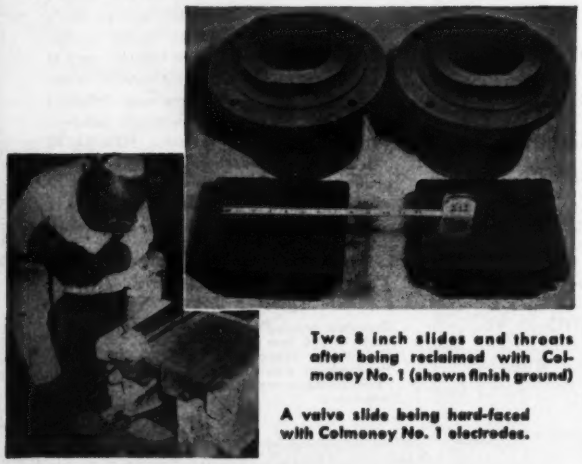
Representatives in All Principal Cities

Check 1218 opposite last page

Longer Valve Life with Colmonoy Hard-Facing

Catalyst slide valve gates, throats, and bodies last up to five times longer when hard-faced with Colmonoy No. 1 electrodes. The success of Colmonoy No. 1 in resisting erosion by catalytic fluids has made it the standard material for hard-facing slide valves by many maintenance shops, job shops, and valve manufacturers.

Colmonoy No. 1 electrodes have a new metallic coating that improves arc stability, permits vertical welding, and eliminates weld cleaning between successive passes. This reduces welding time to cut the already low cost of reclaiming valves with Colmonoy hard-facing.



Two 8 inch slides and throats after being reclaimed with Colmonoy No. 1 (shown finish ground)

A valve slide being hard-faced with Colmonoy No. 1 electrodes.

Write for Colmonoy Hard-Facing Manual #79 for more about Colmonoy hard-facing alloys and methods.

HARD-SURFACING AND BRAZING ALLOYS

WALL COLMONOY CORPORATION

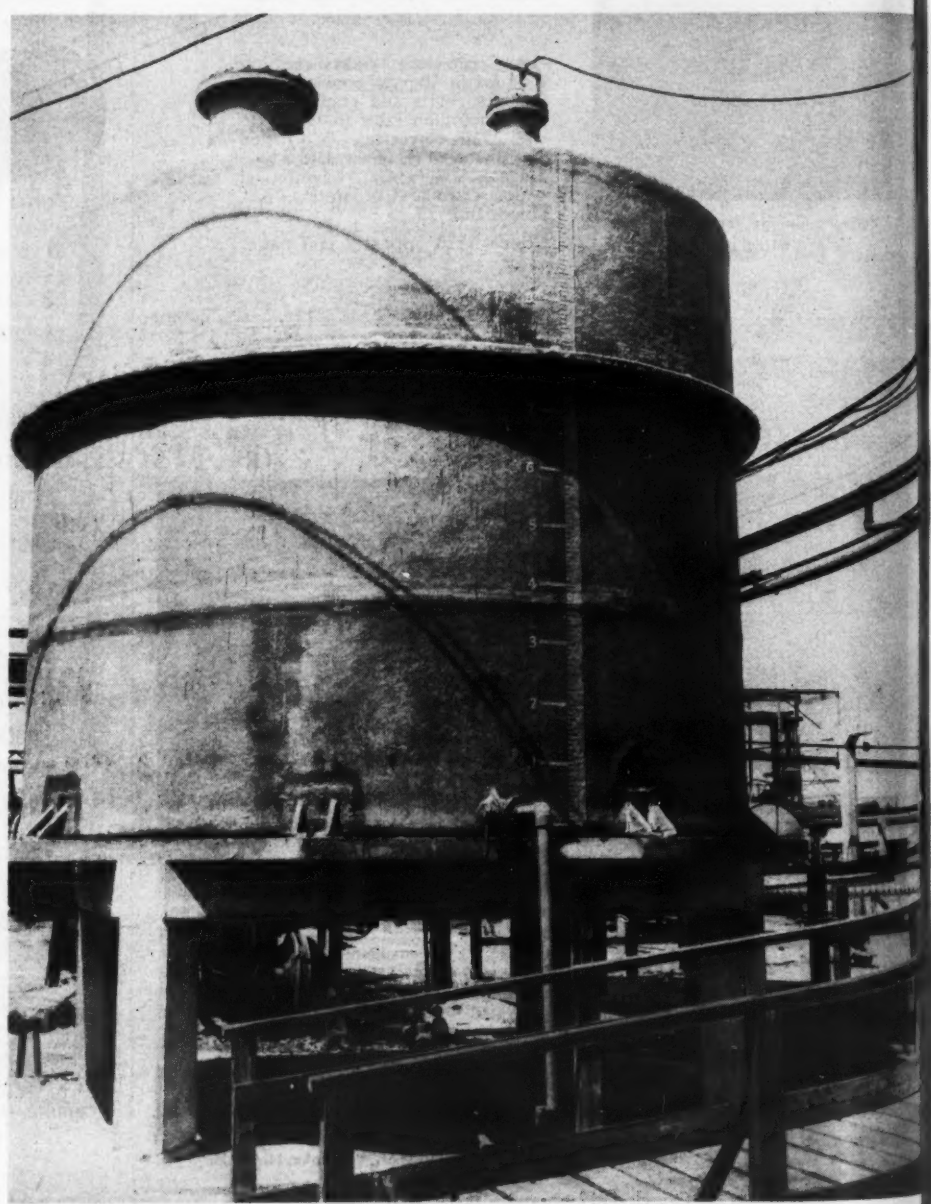
19345 John R Street • Detroit 3, Michigan

BIRMINGHAM • BUFFALO • CHICAGO • HOUSTON • LOS ANGELES
MORRISVILLE, PA. • NEW YORK • PITTSBURGH • MONTREAL • GREAT BRITAIN

Check 1219 opposite last page

Translucent plastic needs no external

Unit constructed of reinforced polyester resin, which holds 14,000 gal of 10% hydrochloric acid, is expected to give long service without maintenance



tank glass gage

ONE feature of large reinforced plastic tank used for storing hydrochloric acid is that no external glass gage is required to show volume in tank. Since the plastic is translucent, the level can be determined at any time. An interior lighting fixture entering top of tank provides sufficient light for level to be read on measurement painted on the outside of the tank (see photo).

Plastic tank holds 14,000 gal of 10% HCl at ambient temperatures. It has required no maintenance since placed in operation in August 1958. It is expected to last almost indefinitely without internal or external maintenance.

Reinforced plastic, called Duracor, is a chemical-resistant polyester resin reinforced with a combination of random glass mat and woven glass cloth. Storage tank has seven layers of reinforcing in bottom and five layers in sides. Bottom is ⅜" thick. Lower section of the sides is ½" thick, while the upper side sections are 7/16" thick. It has a tensile strength of 15,000 psi and a flexural strength of 30,000 psi.

Substantial savings in the production and erection of the tank were realized through the use of an economical contact molding process, plus two-piece construction. Contact molding is used to produce high-strength structures without costly molds, dies, or production tooling. Using relatively inexpensive molds, complex shapes can be fabricated from simple forms and bonded together with reinforced plastic materials of identical strength.

This acid storage tank was produced and shipped in two pieces, and erected in the

To page 125

Teflon-lined pipe helps plant save $60,000 per month... *enables corrosive process to stay on stream*

Problem: Excessive maintenance costs and product losses ran as high as $60,000 per month during first six months' operation of process at a major chemical plant.

The process for the manufacture of a chemical intermediate involves handling hydrochloric acid and organic liquids at temperatures exceeding 275°F. In the past, the highly corrosive properties of this combination had restricted material of construction to non-metallics.

Laboratory work established that many potential advantages could be obtained by increasing operating pressure from a normal level up to several atmospheres. However, a new material of construction would be required for the high pressure service.

An exhaustive search for satisfactory piping materials included a number of alloys, plastics, and other types of materials. The most promising of these were installed. In spite of this program, such frequent failures occurred that on-stream time averaged only 75% during the first six months' period of operation.

Solution: It was found that two experimental lengths of steel pipe lined with Teflon TFE-fluorocarbon resin had been placed on test previously. Both had provided excellent service for 24 months at 230°F and 10 psig. Both were then reinstalled in the new pressure system and were in operation for several more months without failure.

Based upon this and other encouraging results, conversion to steel pipe lined with TFE resin began as soon as it became commercially available. Plant now has more than 1500 feet of the lined pipe in service. Most of it is of 2" size although some up to 6"in diameter is in use. More than 400 Teflon TFE-fluorocarbon lined fittings are in use at the plant.

Results: No failures of the lined pipe have occurred. Some of it has already been in service more than 15 months. Outstanding performance of the lined pipe under the severe conditions has been a major factor in saving the $60,000 per month that was being lost through excessive maintenance and loss of product. Use of the lined pipe promises to make the process as reliable as those with no special materials of construction problems.

NOW OVER 2 YEARS

In the petroleum industry, pipe lined with Teflon has been found to be quite useful for handling hydrofluoric acid at elevated temperatures and pressures. Lined pipe has also proved valuable in chlorination, sulfonation, and nitration processes. Method used by manufacturer for lining pipe compensates for thermal expansion of liner to the extent that fatigue problems and reduction in flow diameter are eliminated.

(Fluoroflex-T pipe and fittings lined with TFE-Fluorocarbon resin are manufactured by RESISTOFLEX CORPORATION, Woodland Rd., Roseland, N. J.)

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Complete systems for corrosive service

Resistoflex

ROSELAND, NEW JERSEY · WESTERN PLANT: BURBANK, CALIF. · SOUTHWESTERN PLANT: DALLAS, TEX.

Check 1220 opposite last page

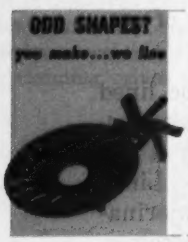
Life in these excited states...

"Glad to see you're a man with ideas, Henry"

Why men with ideas choose ACE equipment

Leading chemical design and development men work in the future... with no time to go back over specifications for equipment that didn't work out. You'll find they reach for Ace corrosion-engineered equipment time and again... just to be *sure*. If equipment failures give *you* no time to think ahead, it's time to give us a call.

High-impact, rubber-plastic, most economical for average chemicals. ½ to 6". Screw or solvent welded fittings. Valves ½ to 2". NSF-approved. *Bul. 80A.*



Rubber or plastic lining is economical life insurance for costly "special" equipment. It's a specialty with ACE. Write for *Bul. CE-53.*

Choice of Rivi-clor PVC, Ace-Ite rubber-plastic, Ace polyethylene or Ace Saran to match *any* plastic pipe. Sizes ½ to 2". Also larger plastic-lined valves.

Ace-Hide, tough as a rhinoceros, insensitive to corrosives, makes this finest of acid pails. Also dippers, bottles, funnels, etc.

ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
DIVISION OF AMERACE CORPORATION
Ace Road • Butler, New Jersey

Check 1221 opposite last page

Fansteel

Corrosionomics

REGISTERED U. S. PATENT OFFICE

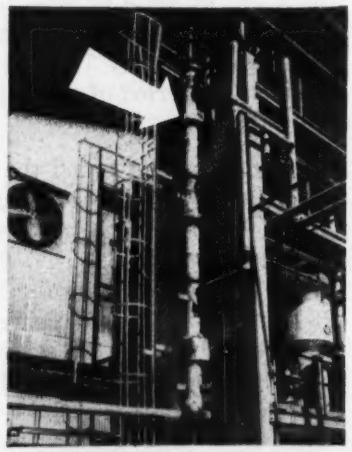
A JOURNAL OF USEFUL INFORMATION FOR THE SOLUTION OF CORROSION PROBLEMS

TANTALUM HEAT EXCHANGER SOLVES HIGH TEMPERATURE HNO_3 PROBLEM

Commercial Solvent's plant at Sterlington, La., produces flake ammonium nitrate by neutralizing nitric acid with anhydrous ammonia. The reaction takes place at 400-460°F., driving off water introduced with the acid. A key piece of equipment in this operation is a Fansteel tantalum heat exchanger which has been giving outstanding service with no visible corrosion noted over a number of years.

Handles HNO_3 at 45 Gal/Min

This Fansteel equipment handles up to 45 gal/min at elevated temperatures with a heat transfer coefficient greater than 550 Btu/hr/sq ft/°F. It is made of three 8-ft. sections in series. If one unit must be removed the other two may be coupled and run at reduced flow. Each unit consists of a bundle of 19 straight tantalum tubes, ½" O.D. and with a 0.015" wall. This gives 20 square feet of heat transfer surface for each section.



Shown without lagging, three-section tantalum heat exchanger raises nitric acid temperature to 330°F.

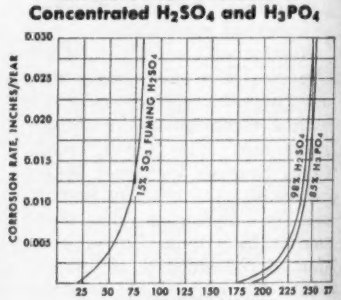
Corrosion Rate Nil in HNO_3

Montecatini, the huge Italian chemical company in Milan, exposed tantalum to 98% HNO_3 containing 0.1% H_2SO_4, 0.4% nitrogen oxides and 1.5% H_2O at 132°C for 762 hours. The corrosion rate was 0.00002 inches per year and the metal was unchanged in appearance. Tests by other companies confirm the low corrosion rates of HNO_3 in all concentrations even at elevated temperatures—as high as 200°C.

"U" Tube Bundles Also Available

Fansteel heat exchangers are also available with "U" tube bundles where processing or physical requirements call for a unit with input and output at the same end. No internal gaskets are used, which makes the leakage problem nonexistent. Teflon* grommets support each tube in the baffle holes and permit free movement, thereby eliminating the differential expansion problem.

Tantalum Also Resistant to Concentrated H_2SO_4 and H_3PO_4

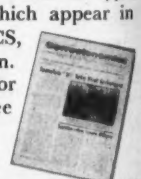


Free Tantalum Test Kit

A corrosion test kit, available without charge to research technicians, if requested on your letterhead; contains both tantalum sheet and wire.

Free Technical Information

The above condensation is typical of the articles which appear in CORROSIONOMICS, a Fansteel publication. Mail us your name for inclusion on our free mailing list.



G584A

*Registered trade mark, E. I. duPont deNemours & Co., Inc.

For further data on the above, write:

FANSTEEL METALLURGICAL CORPORATION
CHEMICAL EQUIPMENT DIVISION
NORTH CHICAGO, ILLINOIS, U. S. A.

Check 1222 opposite last page

CHEMPRO makes them all in Teflon!*

*duPont trademark

CHEMICAL & POWER PRODUCTS, INC.
9 Broadway, New York 4, N.Y.

Check the Bulletins you want:

- ☐ Packings & Seal Cages
- ☐ Gaskets
- ☐ Teflon Stock & Special Molded and Machined Parts

Name_____

Company_____

Street_____

City_____ State_____

Check 1223 opposite last page

See-through Tank

From page 123

field. Tank measures 14′ in height and has a 14′ diameter. Manhole, intake, drain and other appurtenances were molded completely from reinforced plastic as an integral part of the tank.

(Duracor reinforced plastic tank is product of The Ceilcote Company, 4829 Ridge Rd., Cleveland 9, Ohio.)

Check 1224 opposite last page.

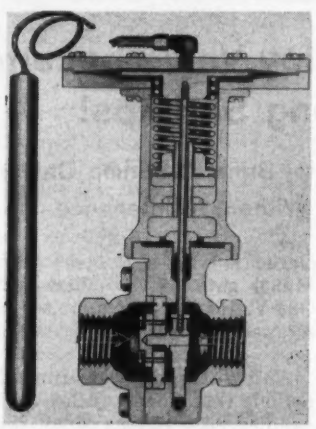
Temperature control valve has lead-coated sensing bulb

Withstands liquids at 400°F

Uses: For use in plating tanks, chemical tanks or heaters, and other corrosive applications.

Features: Unit withstands a wide variety of chemicals at temperatures to 400°F.

Description: Entire thermal bulb and capillary tubing system of sliding gate temperature control valves is coated with lead. Valves are available in sizes from ¼ through 6″.

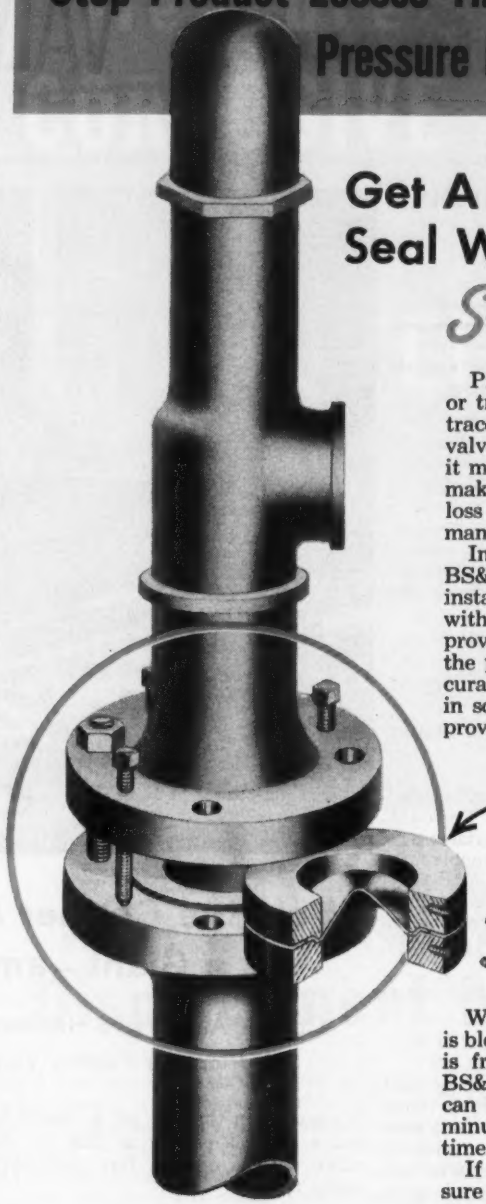


Lead-coated sensing bub gives control valve wide corrosive resistance

(Temperature Control Valves with lead-coated sensing bulb are product of OPW Corporation, Jordan Div., 6013 Wiehe Rd., Cincinnati 13, Ohio.)

Check 1225 opposite last page.

Stop Product Losses Through Leaking Pressure Relief Devices!



Get A "Bottle-Tight" Seal With BS&B *Safety Heads!*

Product loss in a processing or transfer system can often be traced to leaking pressure relief valves. To make matters worse, it may be extremely difficult to make repairs that will stop this loss with any degree of permanence.

In hundreds of such cases BS&B Quik-Sert Safety Heads, installed upstream and in series with the leaky relief device, have provided the perfect solution to the problem. Pressure relief accuracy is in no way impaired . . . in some cases it is actually improved.

When pressure in the system is bled back to normal, the valve is free to close as usual. The BS&B Quik-Sert Safety Head can be replaced in a matter of minutes at any later convenient time.

If you need a leak-tight pressure relief assembly for normal operation of your pressured systems, BS&B Safety Head specialists will gladly survey your installation and submit recommendations.

Write now for details.

BLACK, SIVALLS & BRYSON, INC.

Safety Head Division, Dept. 2-M4
7500 East 12th Street
Kansas City 26, Missouri
Telephone: BEnton 1-7200

BS&B — ANOTHER EXAMPLE OF PRODUCT LEADERSHIP

Check 1226 opposite last page

COOPER ALLOY VALVE BRIEFS

THE VALVE AND FITTINGS ANSWER CORNER

Send in your questions on stainless valves and fittings to Carl Tylka, Cooper Alloy Technical Service Director.

Q. *What is meant by "ferroxyl quality" in evaluation of a stainless casting?*

A. This means a superior surface quality free from pinholes, porosity, scale particles, iron film, grease, or other undesirable conditions, as is guaranteed by passing the ferroxyl test.

Q. *Will stainless steel of the 18-8 type corrode in a moist atmosphere?*

A. Not ordinarily, but it will in contact with graphite.

Q. *Can the use of stainless materials having different hardnesses be effective in preventing galling?*

A. Yes, providing the hardness differential amounts to 50 Brinell or more. Corrosion resistance of the hardened material is generally lowered, however, and trouble may ensue in severe service. Use of V2B alloy as the hardened medium will prevent galling and provide sufficient corrosion resistance.

Q. *Is 18-8s MO (316) better than 18-8s (304) for use in hot strong nitric acid?*

A. No, in this particular case 304 is better than 316.

Q. *Why is it that steel is resistant to 70% sulfuric acid, while stainless 304 is not?*

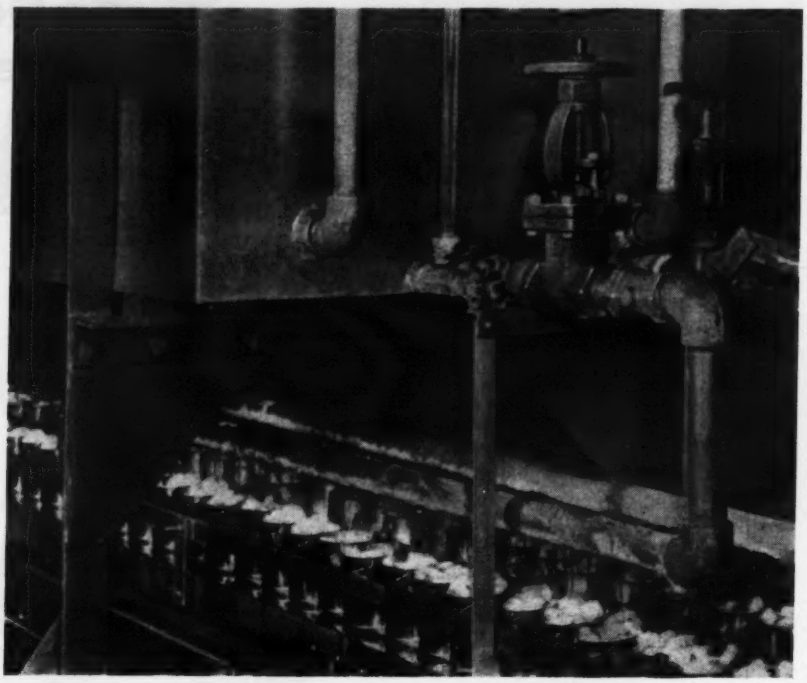
A. Because sulfuric acid forms an iron sulfate film on carbon steel which is insoluble in sulfuric acid of over 65% concentration, thus protecting the steel from further corrosion. This particular film does not form on stainless, which depends upon passivity for corrosion resistance. In 70% sulfuric acid passivity is lost and the stainless corrodes.

Q. *Is 316 alloy better than 304 for handling hot caustic solutions?*

A. No, 316 has no better resistance than 304 and FA-20. That is why Monel is recommended. In extremely severe cases use pure nickel.

Q. *What can I use where 316 is necessary for corrosion resistance, but fails through lack of resistance to accompanying abrasion or erosion?*

A. Cooper PH-55A alloy resists all corrosive media that can be handled by 316 (except very hot and strong nitric acid), and in addition is resistant to both abrasion and erosion.



How the Cooper Alloy Valve became a Giant—among Shrimps!

Cooper Alloy Valve Handles Hot Brine at Shrimp Canning Plant for Twelve Years Without Maintenance

It's not often that we get a chance to put a title as catchy as this on our valve success stories, but this story really rates it!

It all happened at the Robinson Canning Company in New Orleans, one of the world's largest canners of shrimp. They can as much as 100,000 lbs. of shrimp a day—three cans a second! And here's the problem: to the shrimp in each of these cans hot brine solution (180°F.) is added as a preservative—to the shrimps, that is, because brine is mightily corrosive to most valve materials.

The master control valve for this gravity-feed brine-filling operation used to be a brass gate valve, but it couldn't stand the corrosion gaff. So, 12 years ago the Robinson people replaced it with a Cooper Alloy 1-in. Monel gate valve. (Vital statistics: OS&Y, 150-lb. service, bolted bonnet, screwed ends.)

And during the ensuing 12-year period, this Cooper Alloy valve has handled 2500 gallons of hot brine per day—without maintenance of any kind! Only very recently did it become necessary to replace a few non-Monel parts, such as handwheel, packing flange, and eyebolts.

As we said at the start of the story, that's a performance record that's a giant in any man's process! For more information on Cooper Alloy valves and their performance capabilities, write to Cooper Alloy Corporation, Hillside, N. J.

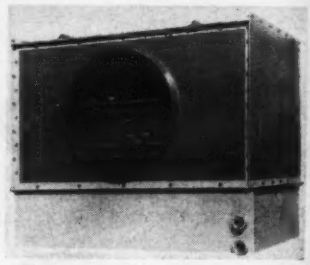
Check 1227 opposite last page

PVC air washers give freer flow, less absorption

Uses: Cleaning air containing contaminants that are instantaneously soluble in water, such as chromic acid, sulfuric acid, and caustics.

Features: PVC ring bed will not absorb contaminated material to lower operating efficiency or contaminate reclaimed solutions. Water consumption is approximately 1 gal/1000 cu ft of air.

Description: Air washer is fabricated entirely of rigid unplasticized PVC. This includes all structural members, spray nozzles, pipe, Raschig rings, bolts, and nuts. External base is located entirely outside corrosion area.



PVC air washers will clean 96 to 99% of instantaneously water-soluble contaminants

Smooth and non-porous PVC construction results in less air-flow resistance, no water absorption, and less material buildup on packing rings or structural surfaces.

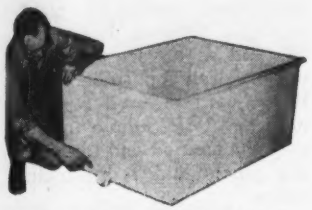
Air-washer operation incorporates three-way action:

1) Air enters first section where velocity is decreased. Air is thoroughly sprayed through nozzles.
2) Air enters Raschig rings' washer bed. Thoroughly wetted PVC rings change air direction at least eight times.
3) Air is fed through eliminator section where heavily entrained water particles are removed. This leaves 97%-saturated clean air to enter exhaust fan.

(PVC air washers are product of Industrial Plastic Fabricators, Inc., Endicott St., Norwood, Mass.)

Check 1228 opposite last page.

All-welded design dooms polypropylene tank leakage



Polypropylene tanks include drain faucets of same material

Self-supporting tanks, fabricated of polypropylene, contain corrosive liquids at relatively high temperatures. All-welded construction, providing leak-proof design, includes 1" drain faucets of same material.

(Polypropylene tanks are a product of American Agile Corporation, PO Box 168, Bedford, Ohio.)

Check 1229 opposite last page.

Cadmium coating process prevents hydrogen embrittlement

Method for vacuum deposition of cadmium makes it possible to protect high tensile steels from corrosion without danger of hydrogen embrittlement. Samples, some of which had been flexed repeatedly, have successfully passed 96-hour salt-spray and salt-bath tests without a trace of corrosion.

(Cadmium coating process is development of NRC Equipment Corporation, 160 Charlemont St., Newton, Massachusetts.)

Check 1230 opposite last page.

Plastic piping system is subject of comprehensive, 16-page technical brochure. Information on Penton, polypropylene, PVC, and Kralastic is given, along with pipe and valves made from them. Table gives chemical resistance of these materials to 182 corrosives. Graph on back shows head loss versus flow rate in plastic piping system. Cat 159—Chemtrol, Div. of Tapered Air Products Corporation, 10872 Stamford Ave., Lynwood, Calif.

Check 1231 opposite last page.

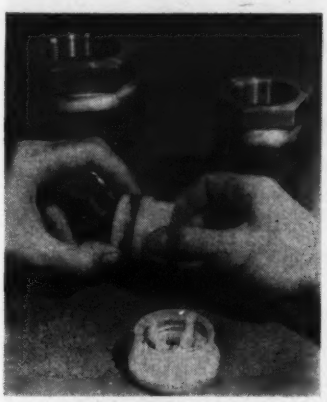
Spiral motion assures longer valve life

Old valves restored at small salvage expense

Uses: As line back-pressure, foot, globe, shut-off, pressure-relief, or tank valve.

Features: Continuous cap rotation, as flow passes through, eliminates incrustations and corrosion. Nylon insert can be used to put old valves back in operation for a minimum salvage cost.

Description: Pressure-check valve has patented nylon insert designed for cylindrical housing. Insert incorporates neoprene O-ring, stainless steel spring, and self-tapping, cadmium-plated screw. It is press-fitted into metal housing with adhesive compound.



Plastic insert in valve repels corrosion

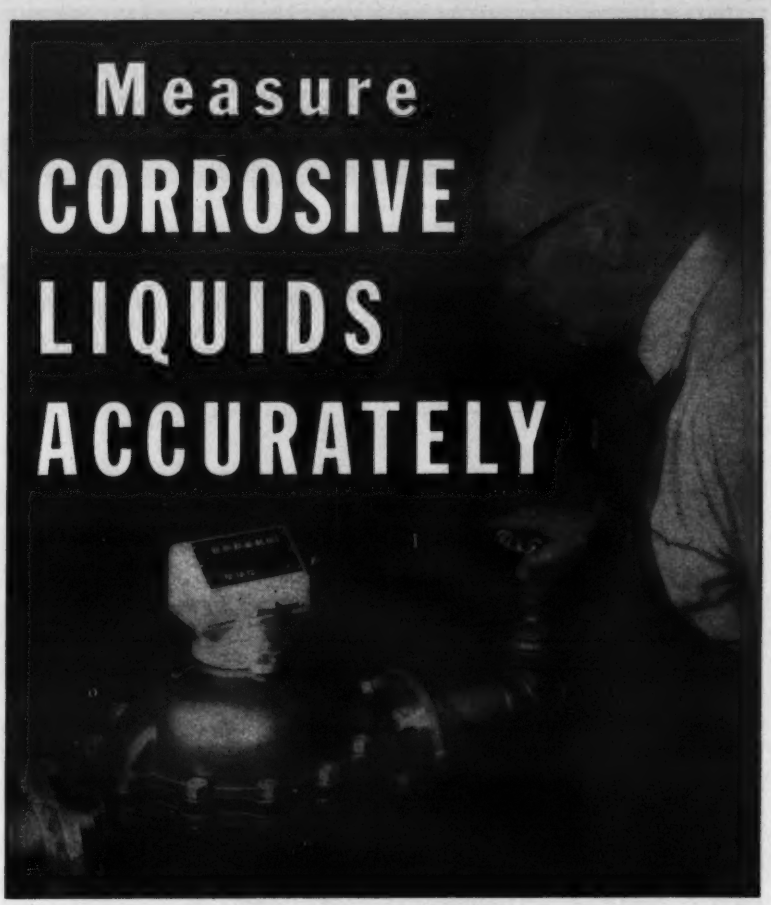
When pressure is sufficient to push cap open, fluid passing through causes rotation of cap. Sizes of insert range from ½ through 2", total unit weight from 0.80 to 6.50 lb. Pressure ranges from 250-lb-plus negative to 500-lb-plus positive.

(Pressure-check valve is a product of Check-All Valve Company, 818 East 22nd Street Court, Des Moines, Iowa.)

Check 1232 opposite last page.

Heat-resisting alloys, such as various grades of Inconel, Incoloy, and stainless steel are charted on a cost comparison basis in bulletin. "Heat Resisting Alloys" — Techalloy Co. Inc., Rahns, Pa.

Check 1233 opposite last page.



with NIAGARA Displacement Meters

Now you can apply the extreme accuracy of Niagara Meters to the measurement of corrosive liquids. Niagara Chemical Meters of Type 316 stainless steel offer good resistance to corrosion and can be used to measure caustic soda, most acids, fruit juices and similar liquids. Available in sizes 3 to 110 G.P.M. or in intermittent use up to 160 G.P.M. Niagara Chemical Meters are also available for automatic liquid measurement and liquid flow control in hazardous or non-hazardous atmospheres.

If you have corrosive liquid metering problems, let us help you. Mail coupon today.

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Please send me information on the complete line of Niagara Meters.

Liquid.....

Flow g.p.m..... Temp.....°F

Name.....

Company.....

Address.....

Check 1234 opposite last page

CREATIVE ENGINEERING at the drawing board helps solve your liquid handling problems on the job. But it takes experience . . . *plus* sweat, skill, and the spark of an idea.

Goulds' design engineers have been "dreaming up" cost- and time-saving solutions to pump problems for over 100 years. More recent achievements include the *glassed* pump for handling corrosives, and the unique *centripetal* self-priming pump for handling liquid and vapors. Such achievements point out that every Goulds pump is built to lick a problem—perhaps *your* problem!

To find out what's available to solve your pumping problems, write to: Goulds Pumps, Inc., Dept. CP-49, Seneca Falls, New York.

GOULDS PUMPS

Check 1235 opposite last page

Polyethylene aspirator is corrosion-free

Uses: Aspirator pump is particularly useful for highly corrosive filtrates. It can also be used as a vacuum section tool to draw up spilled acids. Pump can be used for urea nitrogen tests employing the aeration method and for cleaning pipets and sedimentation tubes.

Features: Check valve, of gum rubber, is integral — not a separate part of pump.

Description: Polyethylene filter pump has removable serrated hose connection on sidearm for quick disconnection of filter flask. Overall height of pump is 6¼".

(Non-corrode aspirator pump is product of Fisher Scientific Co., 303 Fisher Bldg., Pittsburgh 19, Pa.)

Check 1236 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Heat no problem for Ti alloy

Titanium alloy recently developed has excellent long-time strength properties to 1100° F and short-time strength properties to 1500°F. Alloying elements are aluminum (8%), zirconium (8%), and columbium and tantalum combined (1%). Production ingots have been melted, and testing indicates material will be available as forging stock.

(MST 881 titanium alloy is a product of Mallory-Sharon Metals Corp., Niles, Ohio.)

Check 1237 opposite last page.

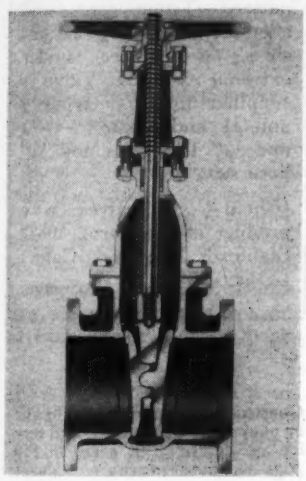
Corrosion-resistant fans are cataloged in 12-page bulletin which includes engineering drawings, capacity, and parts-list tables. Bul F/20 — The Duriron Company, Inc., Dayton, Ohio.

Check 1238 opposite last page.

Split-wedge gate valves are corrosion resistant, self-cleaning

Split-wedge, stainless-steel gate-valve line is suited to wide range of corrosive conditions. Made of Types 316 and J-20 alloys, the valves are fitted with split wedge of ball-and-socket design which automatically adjusts to tapered seating surfaces.

Discs revolve freely in wedge carrier, producing self-cleaning action on seat. Two-piece packing-gland design eliminates binding of



Valve has self-cleaning action

follower when gland bolts are tightened unevenly.

Also included in design of valve are chevron-type Teflon packing, through-port body design, and end flanges conforming to MSS SP-42 specifications.

Size range of 150-lb flanged-end valves (Fig 1327) is ½ to 8"; of 200-lb screwed-end valves (Fig 1326) from ½ to 2".

(Split-wedge, stainless-steel gate valves are product of Jenkins Bros., Room 34, 100 Park Ave., N. Y. 17, N. Y.)

Check 1239 opposite last page.

Polyvinyl-chloride pipe, fittings, and valves are listed in six-page Cat 10050-A — Plastic Products Division, B. F. Goodrich Industrial Products Co., Marietta, Ohio.

Check 1240 opposite last page.

Why Insul-Mastic costs less than ordinary asphalt coatings . . .

THERE are several ways to measure the cost of a protective coating. But the only *true* way is by measuring its *performance*. And performance is determined largely by the materials that go into a coating.

Insul-Mastic is sometimes considered an asphalt-type coating. But, unlike ordinary asphalt coatings, Insul-Mastic contains special materials which resist corrosion and wear far longer and better than straight asphalt coatings.

These materials include:

1. ***Large Amounts of Gilsonite*—the natural resin that is virtually *unaffected by* moisture, acids and alkalis.**
2. ***Mica Flakes*—highly resistant to weather, wear and sun's rays.**
3. ***Asbestos Fibers*—used as binders to provide greater toughness and resistance to wear.**

Obviously, Insul-Mastic costs a few cents more than common asphalt coatings. But, when you measure its cost in terms of *far greater service life* (10 to 20 years is not uncommon), Insul-Mastic *always* proves to be your most economical investment!

Still another important Insul-Mastic *plus* is the technical field service which is available whenever you need application assistance. *Call your Pitt Chem Distributor for full information about Insul-Mastic coatings, today!*

Think First of the Coatings that Last!

PITT CHEM "Insul-Mastic"® Gilsonite-Asphalt Coatings
PITT CHEM "Tarmastic"® Coal Tar Coatings
PITT CHEM "Tarset"® Coal Tar-Epoxy Resin Coatings

PITT CHEM Industrial Coatings are available through leading Industrial Distributors. See the "Yellow Pages."

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Check 1241 opposite last page

IT'S NEWS! IT'S NI-O-NEL!

...a field-proven Inco Nickel Alloy for handling certain hot acids and oxidizing chemicals

Inco is now making available a field-proven alloy to handle corrosive conditions of unusual severity.

The alloy, called Ni-o-nel*, is made of Nickel (42%), chromium (21.5%), and iron (30%) with additions of molybdenum and copper. It is highly resistant to hot sulfuric, sulfurous and phosphoric acid conditions and to oxidizing conditions such as nitric acid solutions, nitrates and cupric, ferric and mercuric salts, except the chlorides.

Ni-o-nel alloy is stabilized by the addition of titanium and by its moderately low carbon content to prevent attack due to carbide precipitation.

In phosphoric acid:

1. Ni-o-nel alloy submerged cylinders and baffle plates in submerged combustion evaporators concentrating wet process phosphoric acid at temperatures up to 280°F, are giving 3 to 5 times the service life of previously-used materials.

2. In the dip pipes of units concentrating phosphoric acid by passing preheated air into the acid, Ni-o-nel alloy outlasted the previous alloy by 11 to 7.

3. In a defluorinating unit handling phosphoric acid of 54% P_2O_5 content, Ni-o-nel alloy lasted 2 to 6 times longer than the best previously-used alloy.

4. Ni-o-nel alloy can also be used in many similar applications such as hydrocarbon polymerization processes using phosphoric acid as catalyst, and for heating coils in the application of phosphate coatings to steel.

In sulfuric acid:

1. Platecoils of Ni-o-nel alloy have been used for heating a 12% (by wt.) sulfuric acid pickling bath maintained at 170°F. The platecoils lasted approximately 3 years (6 times longer than those of another resistant alloy).

2. Ni-o-nel alloy dancer roll arms in a continuous pickler used for processing steel strip in 8-12% sulfuric acid at 130°F temperature have so far lasted 17 months — 3 times longer than the previously-used alloy, and are still going strong. The Ni-o-nel alloy parts are subjected to considerable aeration as well as to the pickling solution itself.

In other corrosives:

1. Sulfurous acid. Ni-o-nel alloy has been shown to be superior to alloys customarily used to handle sulfurous acid in pulp and paper applications and in handling sulfurous combustion gases.

2. Nitric acid mixtures. Ni-o-nel alloy is resistant to nitric acid solutions of practically all temperatures and concentrations and shows good promise for handling such mixtures as nitric-sulfuric, nitric-phosphoric and some nitric-hydrofluoric acid solutions.

3. Organic acids. The alloy is resistant to most organic acids and has excellent resistance to boiling concentrated acetic acid, acetic-formic mixtures, maleic and phthalic acid and a number of others.

4. Sea water and chlorides. This alloy not only resists a wide range of chemical corrosives but also certain troublesome salt cooling waters, making it particularly adaptable for heat exchanger equipment. It resists pitting in salt water and has excellent resistance to stress-corrosion cracking.

*Registered trademark

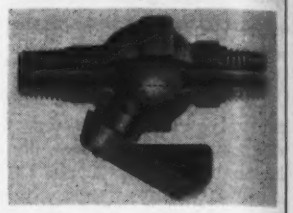
Ni-o-nel alloy is a fully developed engineering material

Ni-o-nel alloy is made in all mill forms needed for fabricating process equipment... including welding electrodes. To get detailed information on this new engineering material, write for Inco's booklet, "Introduction to Ni-o-nel."

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street New York 5, N.Y.

INCO NICKEL ALLOYS

Check 1242 opposite last page.



Plastic ball valve

. . . is designed for original equipment, laboratories, monitoring-valve systems, and other corrosive operations.

Ball construction presents straight-flow, non-turbulent pattern. Teflon seats and chemical-resistant seals assure performance under extreme exposure. Valve is supplied in PVC types I and II and Penton — ⅛ and ¼" IPS sizes and ¼" hose sizes.

(Chem-Cock valves are product of Chemtrol, 10872 Stanford, Lynwood, Calif.)

Check 1243 opp. last page.

Construction materials for fertilizer plants and phosphoric acid service are described in detail in 250-page technical brochure. Valuable information on corrosion resistance of metals, plastics, rubbers, and other products is presented.

Corrosion resistance of more than 150 materials is tabulated and discussed at length for each of various typical services encountered. Ability of each of these products to withstand phosphoric acid, sulfuric acid, and a variety of corrosive fertilizer slurries is covered. Particularly interesting is the section on plastics, with information given on some quite recent developments in this field. Cost data are also included.

"Materials of Construction for Fertilizer Plants and Phosphoric Acid Service" — Chemical Construction Corporation, 525 West 43rd St., New York 36, N. Y.

Check 1244 opposite last page.

Stainless-steel fittings designed for Schedules 5 and 10 pipe are fully outlined in catalog. Any type joint can be used on any end of fittings covered in Stainless-steel Fitting Cat—Horace T. Potts Company, 500 Erie Ave., Philadelphia 34, Pa.

Check 1245 opposite last page.

Corrosive-resistant paint conventionally applied

Corrosive-resistant, fire-retardant paint, which can be conventionally applied by brush or spray, is now available. It is based on Hypalon.

Flexibility gives paint applicability for use on polyurethane foam and rubber. The paint can be made in any color.

(Guardsman Hypalon coating is a product of Grand Rapids Varnish Corporation, 1350 Steele Avenue SW, Grand Rapids, Michigan.)

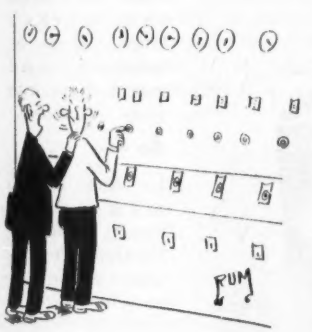
Check 1246 opposite last page.

Fluorocarbon check valve fights corrosion

Steel-armored check valve, with fluorocarbon construction on fluid surfaces, is impervious to a wide variety of chemicals. Valve is suitable for severely corrosive services where valve failures due to balls sticking are a problem.

(Kemlon check valve is product of Keystone Engineering Co., 6315 England St., Houston 21, Texas.)

Check 1247 opposite last page.



"You'll do all right here, Stewart, if you'll just remember that the machine has the brains."

CORROSIVE FUMES?

HANDLE THEM WITH THESE SPECIAL "BUFFALO" FANS

"Buffalo" Cast Iron Exhauster

"Buffalo" Fiber Glass Fume Fan

"Buffalo" Cast Iron Exhausters are built to withstand extreme corrosive conditions in the chemical process industries. High efficiency is the result of low-turbulence air flow design. This includes heavy-duty cast iron housings and cast inlet cones with integral inlet vanes. Non-overloading characteristics are preserved despite changes in system pressure. Available with direct motor drive, separate belt drive or package unit with adjustable pitch V-belt drive and motor mounted on adjustable base rails. Write us for full information.

"Buffalo" Resin-Bonded Fiber Glass Fume Fans are highly resistant to such chemical corrosives as acids, salts, gases, organic materials and others. They are suitable for temperature applications up to 300° F. The fan housing is constructed entirely of fiber glass. All exposed parts of the factory-balanced rotor are encased in thick fiber glass. Standard capacities range up to 34,000 cfm at pressures to 10" static. Investigate the advantages of "Buffalo" Type "FG" Fume Fans — versatility, lighter weight, reasonable cost, dependability. Write for Bulletin FI-511.

These two specialized fans are representative of the air handling units engineered by the Buffalo Forge Company to help you combat the corrosive fumes encountered in many industrial processes. In addition to these fans, "Buffalo" offers rubber lined fans, fans with other special coatings and a comprehensive line of air cleaning units.

For complete details on "Buffalo" corrosive fume handling units, contact your "Buffalo" engineering representative or write us direct.

"Buffalo"

BUFFALO FORGE COMPANY

BUFFALO, NEW YORK

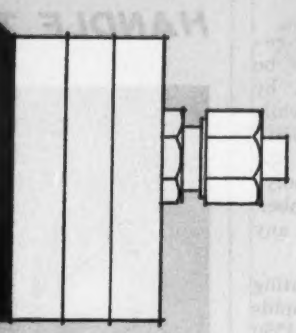
Buffalo Pumps Division, Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING • AIR CLEANING • AIR TEMPERING • INDUCED DRAFT • EXHAUSTING • FORCED DRAFT • COOLING • HEATING • PRESSURE BLOWING

Check 1248 opposite last page

off-the-shelf pumps just right for your requirements



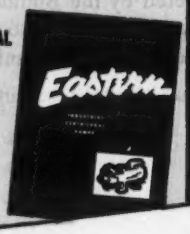
Whatever you want in a pump – for hydraulics, for flow or process control, there is likely to be an Eastern ready-made unit . . . made-to-order for your needs.

CAN YOU USE THESE PUMP FEATURES:

- ☐ corrosion resistant construction for chemical solutions?
- ☐ ability to handle organic and inorganic fluids at various temperatures with flows up to 70 GPM, pressures to 65 psig?
- ☐ available with open, enclosed or explosion proof motors?
- ☐ compact lightweight units with or without motor?
- ☐ high efficiencies in handling hydraulic oil, fuel and lubricants at high pressures?
- ☐ flow rates from 0.1 to 9.8 GPM, pressures from 0 to 1500 PSI?
- ☐ self-priming operation with non-lubricating liquids?
- ☐ high pressure outputs with small, low power units... and no contamination of fluid?
- ☐ flow rates from ½ GPM to 5½ GPM, pressures from 30 to 200 PSI?

An EASTERN CENTRIFUGAL PUMP MIGHT BE JUST RIGHT FOR YOU!

Write for Bulletin 120.

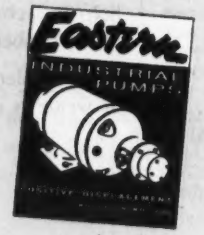


Look into EASTERN HYDRAULIC PUMPS!

Write for Bulletin 810

Get to know more about EASTERN POSITIVE DISPLACEMENT PUMPS!

Write for Bulletin 220.



These useful brochures contain full specifications on the complete line in each category, including performance data and tables. They will be sent to you at no obligation whatever. Write Department W.

EASTERN INDUSTRIES, INC.

100 SKIFF STREET, HAMDEN 14, CONN.

DATA SAVERS!

CP's Processing and Engineering Data Section is for you!

Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations.

They have been sent to us by our many readers.

Perhaps, you will find them to be of value to you.

A wide variety of information can be found in this section. So, no matter what your particular field you will find suitable data to aid you in your daily work.

And —

the section pages are designed to fit easily into regular data files.

Keep them handy for use in making quick calculations in the plant or office.

Just cut along the marked edge, punch as indicated, and insert them into your notebook.

So —

be sure not to miss this month's "Data" Section. It begins on page 43.

For more information on product at left, specify 1249 see information request blank opposite last page.

'Lost revenue' of $3000 a month recovered with collapsible tanks

Rubber containers enable chemical company to get return payloads for trucks hauling raw materials from Ohio to New Hampshire

PAUL HOFFMAN, News Editor
with **E. J. ROMAY,** Vice President
Resi-Chem Corporation,
Swanton, Ohio

PROBLEM: Operating tank trucks the majority of the time without payloads on return portion of round trips was costing Resi-Chem Corporation considerable lost revenue.

Two 3300-gal stainless steel, rubber-lined tankers were in service transporting a formaldehyde solution from the company's plant at Swanton, Ohio, to one at Gorham, N.H., a distance of nearly 950 miles one way. The solution is converted into urea-formaldehyde resin for use by paper mills in the New England area.

Cleaning tankers so they could return with a payload was impractical. Such an operation was expensive, time-consuming, and laborious. Unless trucks were thoroughly cleaned, there was the ever-present threat of contaminating other products hauled on return trip. In addition, industries in the Gorham area seldom had liquid materials of the type which would lend themselves to over-the-road hauling.

Solution: Two 33-ft Fruehauf volume vans were converted to "tankers" through purchase of collapsible rubber tanks called Sealdtanks. One tank has 2000-gal capacity, the other 3000-gal.

Pumps, which are integral parts of each tractor-van combination, load the formaldehyde solution directly into rubber tanks from tankers, as shown, or from storage tanks at the plant. Only an hour's time is required to load or unload containers.

The 3000-gal tank fills the interior of its van on the trip from Swanton to Gorham. There is sufficient room in the vehicle carrying the 2000-gal tank to provide space for 16 drums of other materials, or approximately 10,000 lb of any packaged product, on the back end.

After unloading at the Gorham plant, tanks are rolled up and placed in a built-in storage box in each van. Boxes each occupy 49 sq ft of floor space.

Vans then are dispatched to Berlin, N. H., six miles away, where they are loaded with fiber pipe — an operation that takes only a few hours. Pipe is stacked to fill van interior, including space atop storage boxes. Very little payload space is wasted.

The pipe manufacturer is represented in the Midwest by

Nearly filled, rubber tank resembles gigantic, futuristic frankfurter as it lies on bed of tractor-van

Pump on tractor-van fills up collapsible rubber tank, carried on inside, with chemical raw materials

Within this 49-sq-ft box in tractor-van interior is the collapsed rubber tank which, when filled, holds 3000 gal of chemical raw materials. On return trip to Ohio plant, fiber pipe is stacked atop box in filling van's interior

Photos by Lawrence De Vos

Resi-Chem, which purchases the material and sells it to plumbing supply accounts throughout the Midwest. Pipe is stored in plant yard at Swanton for reshipment at a later date when no orders are on hand.

Results: Gross profits have been increased by approximately $1500 for each van per month because of the return payloads.

Part of the increased revenue has been used to purchase two sleeper-vans so that each vehicle can make two round trips weekly as opposed to one made by the original trucks. This has improved versatility of each tank-equipped van, therefore enhancing profitability of the operation.

Furthermore, tanks have enabled company to draw up plans for shipping finished products in these containers into certain areas where it will be possible to pick up bulk raw materials as a payload on return trip.

(Sealdtank is product of U.S. Rubber Company, Rockefeller Plaza, New York 20, N. Y.)

Check 1251 opposite last page.

Next month . . .

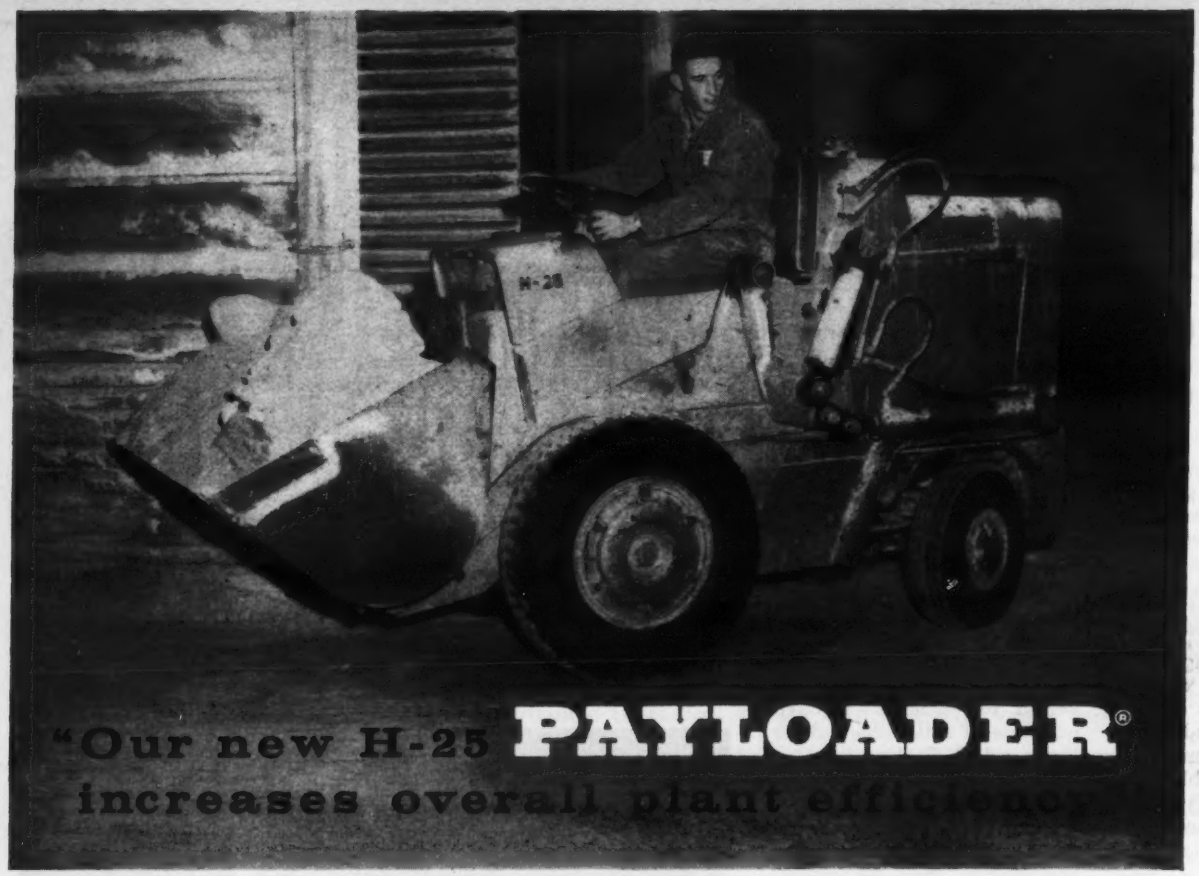
MATERIAL HANDLING & PACKAGING TO BE FEATURED

The spotlight falls on material handling and packaging in CHEMICAL PROCESSING next month. This section will be considerably expanded to include many special features.

Top chemical-company authorities will view future trends they see developing. ICC regulations that bear on chemical packaging will be discussed. Results of a Putman survey on bulk conveyor usage and trends will be announced.

Also — There will be case-history analyses of how specific handling and packaging problems are being solved . . . plus brief descriptions of many new product developments.

Look for this important Feature . . . in May CHEMICAL PROCESSING.



*That's how Ralph J. Puetz, Plant Supt. of Senesac Fertilizer, Inc., Fowler, Indiana sums up the benefits of the H-25's "larger bucket capacity, power-shift transmission and other operating features". At the same time, he also adds a good word for their 4-year old model HA which "has worked continuously, giving very good service with no repairs except normal maintenance".

If you want to get more production per tractor-shovel and per operator, the Model H-25 "PAYLOADER" merits your consideration.

BUILT FOR PRODUCTION — On several occasions Senesac's Model H-25 has unloaded 50-ton rail cars of bulk material in one hour. With its 2,500 lb. carry capacity — 25 to 50% more than has been heretofore available in a 6-foot-turning radius unit — the H-25 can carry more per trip. Because of its power-steer and power-shift transmission with 2 speed ranges forward *and* reverse, it handles with finger-tip ease and cycles faster to make more trips. The more-powerful bucket break-out action, and more-positive traction provided by power-transfer differential get big loads easier out of hardened stockpiles.

BUILT-IN PROTECTION — It has extraordinary protection against dust and dirt damage: triple air cleaners — precleaner and two oil-bath air cleaners; cartridge-type oil filters on the three oil systems; sealed self-adjusting hydraulic service brakes; parking brake enclosed in transmission; special oil and grease seals on all vital points.

For bigger loads, for faster, easier operation — for more production per shift at lower net cost per ton, get an H-25 demonstration from your Hough Distributor. Ask him about Hough Purchase and Lease Plans, too.

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If you are responsible for processing operations in an administrative capacity as plant superintendent, chemical engineer, chemist, engineer or equivalent responsibility . . . in a plant of substantial operations* where chemical processing is an important factor . . . CHEMICAL PROCESSING will be sent to you without charge or obligation if you request it. Use form below. In requesting, be sure to answer all questions. If your firm is not rated or listed in standard references, indicate size of the company by capacity, annual sales or number of employees. Unless all information is given, magazine will not be sent.

*"Substantial operations" does not necessarily mean an extremely large plant. But requests for the magazine exceed supply so we must set standards to insure publication being sent where it can be used to best advantage.

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Main Products

Provides accurate control in filling of liquid, dry products

Uses: Control of can- or package-filling operations with either dry or liquid materials and various sizes and shapes of containers.

Features: High degree of sensitivity; measures to plus-or-minus 1/64" of target fill level with liquid products. Reliability is assured from minimum rate of 60 containers per minute to an unlimited maximum, manufacturer reports.

Description: System is comprised of fill-measuring head and fill-control instrument. Containers are conveyed between gamma-energy source and detector in head. Amount of energy reaching detector varies in proportion to fill height; detector produces signal related to average height of fill.

This signal is indicated on meter in fill-control instrument, which also contains high and low contacts from which feedback control of filling machine is actuated.

Fill-measuring head, which occupies only 25" of conveyor-direction space, is light weight and easily installed, but can be washed down with water or steam. System may be used before or after capping operation.

(AccuRay continuous container-fill-control system is made by Industrial Nucleonics Corporation, 1205 Chesapeake Ave., Columbus, Ohio.)

Check 1253 opposite last page.

Vane-type feeders for handling pulverized and granular dry materials, with circular or rectangular outlets, are cataloged in bulletin. Roll-type feeders are also covered in Feeder Bul — Fuller Company, Subsidiary of General American Transportation Corporation, 136 Bridge St., Catasauqua, Pa.

Check 1254 opposite last page.

Wire baskets for use in dipping, pickling, toting, and conveying are described in Cat MS-57 — Wire & Iron Products, Inc., 1722 16th St., Detroit 16, Mich.

Check 1255 opposite last page.

Another packaging advance by Continental

the new

HI-STACKER

utility can with reversible spout

- *Saves time, space, filling and shipping costs*
- *Simple to palletize*
- *I.C.C. approved*

Continental's new, Dome-top Hi-Stacker makes every inch of shipping, storage and display space count. It's easy to fill, easy to handle. Filler openings are available to fit your requirements. For further details, ask your Continental man.

REVERSIBLE SPOUT RIDES SAFELY, ATTACHES EASILY

Spout remains inverted during shipment and storage. To pour, spout is reversed – ready for fast, smooth dispensing. Spout remains in fixed position until container is empty.

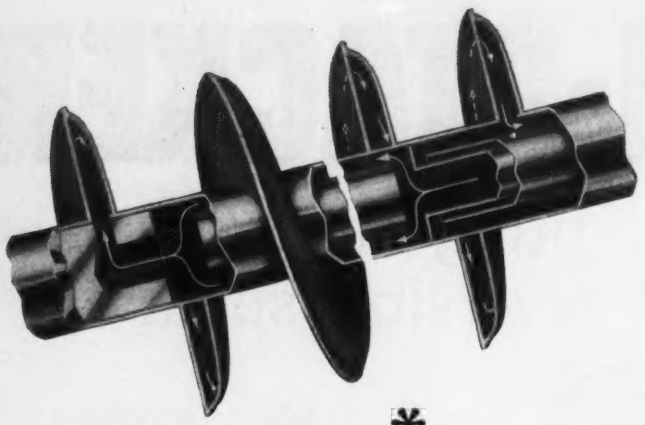
Looks like Continental's famous Dome-top utility can (at left). Has all its sales features. Completely redesigned to save space and money.

CONTINENTAL CAN COMPANY

Eastern Div.: 100 E. 42nd St., New York 17
Central Div.: 135 So. La Salle St, Chicago 3
Pacific Div.: Russ Building, San Francisco 4
Canadian Div.: 5595 Pare St., Montreal, Que.

Check 1256 opposite last page

New savings in heat-exchange processes . . .



THE **holo-flite** PROCESSOR
(HOLLOW-FLITE)

A simpler, more compact way to cool, heat or dry—in continuous flow!

Do you have processes where slurries, solids, pulps or pastes must be cooled, heated or dried? Do you know you can now handle such processes—*in continuous flow*—in as little as 1/5th the space required by other types of heat exchangers—and with many other important advantages?

The revolutionary HOLO-FLITE Processor is the answer!

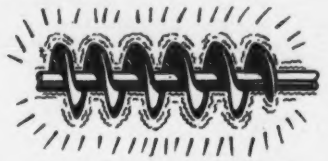
what IT IS!

Basically the HOLO-FLITE consists of two or more flights of hollow-bladed screw conveyors. The product to be processed moves in a trough around the conveyor screws. The heat-transfer fluid circulates through the hollow blades and shafts of the conveyor. The product is constantly rotated into, around, under and over the blades and shafts through which the heat-transfer fluid is circulating, assuring quick, uniform heat passage between the two mediums—*as the product is continuously moved along in a bulk-flow without interruptions!*

Our engineers will gladly study *your particular* operations and make recommendations. Write, wire or phone our nearest office!

why IT'S BETTER!

The HOLO-FLITE principle provides many important advantages in modern processing operations . . .



ITS LARGE HEAT-TRANSFER SURFACE requires far less space—as little as 1/5th the space required by other heat-exchange equipment. Further, flights can be "stacked" as high as desired to save floor space, simplify installation!

ITS SLOW ROTATION IS SO GENTLE that granular and powdered solids are handled with no dusting—little or no particle abrasion. Result—no dust recovery problems . . . simple, inexpensive installation.

IT IS ADAPTABLE to a wide range of applications—handles solids, pulps, pastes and slurries with equal ease. Heat transfer agent can be refrigerant, water or other fluids to provide a wide range of temperatures. Cooled products can be packed directly from HOLO-FLITE discharge, saving time, space and additional handling.

IT CAN BE DESIGNED to handle virtually any capacity by varying the diameter and length of the flights, and the number of "tiers."

FREE 8 PAGE bulletin describes Holo-Flite features and applications. Send for your copy!

COTTRELL Electrical Precipitators
MULTICLONE Mechanical Collectors
CMP Combination Units
DUALAIRE Jet-Cleaned Filters
HOLO-FLITE Processors
HI-TURBIANT Heaters

WESTERN
PRECIPITATION
CORPORATION

Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries

LOS ANGELES 54 • NEW YORK 17 • CHICAGO 2 • PITTSBURGH 22 • ATLANTA 5 • SAN FRANCISCO 4

Representatives in all principal cities

Precipitation Company of Canada Ltd., Dominion Square Bldg., Montreal

Check 1257 opposite last page

Towline conveyor speeds production

Two overhead tow conveyor lines are used in an unusually productive application at the Fastener Div. plant of National Lock Co., Rockford, Ill. Conveyor lines consist of hand-lift trucks attached by the handles to overhead tow chains. Lines follow production layout of plant. On one towline, trucks, carrying skid-loads of incoming materials, are pulled from the receiving area through machining departments by continuously moving chain. The other line tows trucks through heat treating, plating, packing, and shipping.

(Information on trucks may be obtained from Barrett-Cravens Co., 628 Dundee Rd., Northbrook, Ill.)

Check 1258 opposite last page.

Fills containers in carton

Uses: For filling containers while still in packing case.

Features: All nozzles of unit are interchangeable. Contact parts are made of stainless steel and clear plastic tubing. A skate-wheel conveyor makes for ease in transporting packing cases before and after filling.

Description: Model is equipped for vacuum or gravity operation. It can fill four one-gal containers and up to 12 qt and 16 pt without removing containers from packing case.

(Model PCF-1 carton filler is manufactured by Packer Machinery Corporation, 109 14th St., Brooklyn 15, N. Y.)

Check 1259 opposite last page.

THAT'S INTERESTING

Push-button hypos

The sting of the hypodermic needle may soon be a thing of the past. A spokesman for G. Barr and Company, Chicago, predicts that aerosol containers may replace hypos to carry drugs to the bloodstream. He said aerosol inhalants would transmit drugs to circulatory system, through the lungs, almost as rapidly as by intravenous injection.

Going together

How to keep job order with job through plating, pickling, and finishing is solved by a "Work Order Tube." Available from A. E. Maybrun Co., Santa Rosa, Calif., high temperature polyethylene tube is 1⅛" in ID with 8½" inside length. It is sealed by a single turn screw cap on an O-ring washer seal at bottom of cap to prevent moisture seepage.

For more information on product at right, specify 1260 see information request blank opposite last page.

Sets pace for fast flow!

Watch agile Towmotor lift trucks keep multi-ton loads flowing through busy, congested mills and factories—and you'll know why they lead the way in materials handling. Notice the fast pace they set for *every department* as they hustle all types of materials through receiving, production and shipping.

Discover why Towmotor lift trucks have the tough-as-nails stamina for *continuous operation*—cutting handling costs to bedrock day after day. Ask for new "Pace-Maker" Booklet SP-23 . . . and Certified Job Studies applying to your specific handling operations. (Also ask about new foot-controlled *Towmostatic Drive*, available now on some Towmotor models.) Write Towmotor Corporation, Cleveland 10, Ohio.

COME SEE US AT . . .
MATERIAL HANDLING INSTITUTE'S EXPOSITION
CLEVELAND AUDITORIUM
JUNE 9-12 1959
BOOTHS 1302-1307-1404

TOWMOTOR
THE ONE-MAN-GANG
-GERLINGER

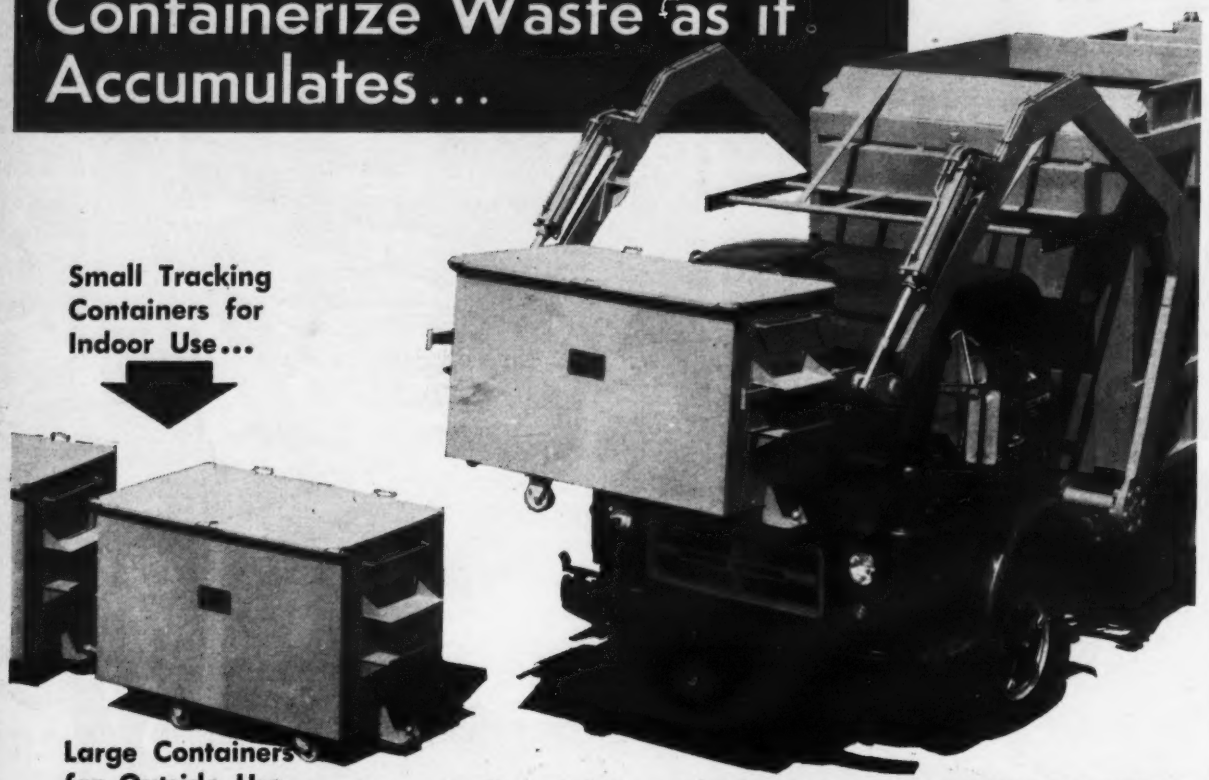
LEADERS FOR 40 YEARS IN BUILDING FORK LIFT TRUCKS, CARRIERS AND TRACTORS

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

cut disposal costs by two-thirds...

Containerize Waste as it Accumulates...

Patents Pending



Self-Loading DEMPSTER-DUMPMASTER Handles 6 Sizes of Containers...

If you're using boxes, bins, cans or carts to handle or store big-volume waste and refuse, you can reduce costs by more than two-thirds with the new DEMPSTER-DUMPMASTER System of waste storage and collection.

One Dumpmaster serves any number of detachable metal containers placed at waste accumulation points. Making its rounds, the Dumpmaster picks up each container, in turn, empties the contents into its packer body and compresses the material to a fraction of its former volume assuring big pay loads on every trip to the disposal area.

The DEMPSTER-DUMPMASTER is economical! One man operation. It's safe! Clearance lifting arms never pass the cab windows, can't injure operator. Containers can be used indoors or outdoors, on ground, below grade or on a dock.

This system is also available on a monthly fee basis through a nearby DEMPSTER-DUMPMASTER equipped private hauler, (name furnished on request).

WRITE TODAY FOR FREE BROCHURE

Mfd. By DEMPSTER BROTHERS Inc.

DEMPSTER DUMPSTER® SYSTEMS

Dept. CP-4 DEMPSTER BROTHERS, Knoxville 17, Tennessee

Check 1261 opposite last page

Pneumatic conveyor for in-plant handling is trailer-mounted

Uses: For in-plant handling of granular free-flowing materials.

Features: Unit is mobile, combination positive- and negative-pressure pneumatic handling system.

Description: Equipment is mounted on a four-wheel trailer. Overall height of system is less than 8'. Unit includes a 14 x 10 rotary vane air-lock feeder for large capacity. In-line filter, with easily removable filter bag, is included.

(Mobile Pneu-Pac® is development of Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pennsylvania.)

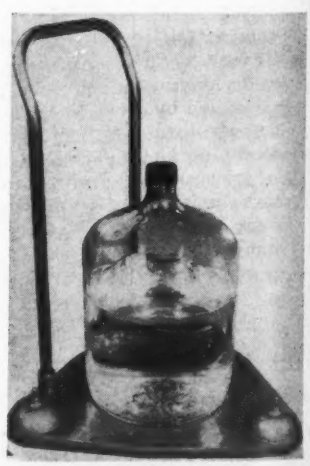
Check 1262 opposite last page.

'Caddy carts' move bottles, carboys

Uses: Handling bulky bottles or carboys of solutions commonly used in labs.

Features: Unit, with low center of gravity, virtually eliminates all lifting, making it easier and safer to handle bottles.

Description: Rated for loads up to 300 lb, unit is available in two models—one for carrying bottles alone, the other for carrying bottles in carboys.



Bulky bottles are handled more safely and more easily in laboratories with this caddy-type cart

Base of each model is one-piece aluminum casting, heat-treated for extra strength. Unit rests on two-inch, ball-bearing, hard-rubber casters.

(Carboy Caddy, available in Model 101 for transporting bottles and Model 202 for carrying bottles in carboys, is manufactured by Laboratory Construction Co., 8811 Prospect Ave., Kansas City, Mo.)

Check 1263 opposite last page.

Variable container tare-out handled automatically

Uses: Filling containers of various weights with like amounts of material.

Features: System permits automatic taring-out of containers.

Description: Automatic tare-out system controls are centered in wall-mounted panel. Servomechanism is used for weighing net amount. Potentiometer is on dial scale.

System operates in following manner: Placement of container in take-away conveyor (on the dial scale platform) initiates impulse. This actuates motor, driving potentiometer to 0 reference, although dial indicates true weight of container.

After pre-set interval, impulse is given to feeding mechanism. Delivery thus begun ends when potentiometer reaches cut-off, pre-set by operator on weight selector dial. Conveyor take-away can then be energized to release filled container and repeat operation.

Manual controls, and provisions to prevent two containers from being weighed at once, are included.

(Richardson tare-out system is a product of Richardson Scale Co., Clifton, N.J.)

Check 1264 opposite last page.

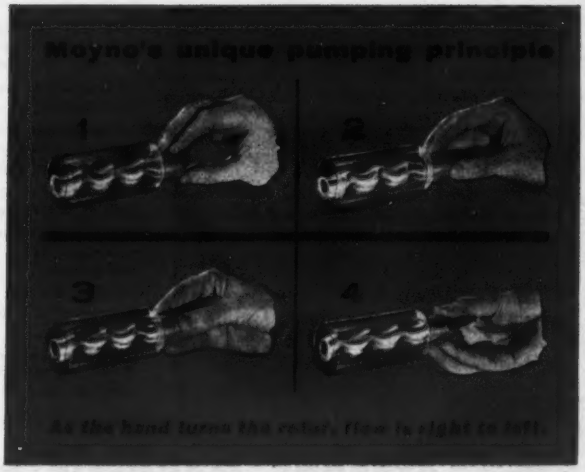
For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

MOYNO'S® Progressing Cavity Pumps Handle Chemicals that *Ruin Other Pumps!*

MOYNO's unique *"progressing cavity"* principle and special resistant internal parts slash pump maintenance costs on problem chemicals that ruin other pumps. Any chemical that can be forced through a pipe—from thin watery slurry to extremely viscous rubber dough—can be pumped with a MOYNO.

As illustrated at right and in the cutaway model above, a rugged screw-like rotor turning inside a double-threaded stator forms *"progressing cavities"* which move chemicals smoothly. Fluids are pumped without turbulence, agitation or pulsation, and discharged uniformly. Rotor and stator materials resist abrasion and corrosion. Hundreds of difficult chemicals successfully handled prove that MOYNOS show little wear, even after long service. They have increased production and greatly lowered downtime on many jobs where they replaced other type pumps which had run up prohibitive maintenance costs or failed completely. On other jobs, MOYNOS have succeeded where chemicals were formerly moved by hand or other expensive means because they were considered unpumpable.

MOYNOS are available in capacities up to 500 gpm; pressures up to 1000 psi. Off-the-shelf replacement parts are always immediately available. To find out how you can decrease chemical pumping costs, write today for Bulletin 40 CP



ROBBINS & MYERS, INC.

motors, household fans, Propellair industrial fans, hoists, Moyno industrial pumps

SPRINGFIELD, OHIO • BRANTFORD, ONTARIO

Check 1265 opposite last page

New! STEARNS INDOX V

Drum Separator gives you greater protection against tramp iron... *at lower cost!*

Install a Stearns Indox V Permanent Magnet Drum Separator — and forget about tramp iron worries! Stearns engineers have developed a unit that far surpasses ordinary permanent magnet types — actually gives you up to *40 percent more magnetic strength* for effective tramp iron removal.

The reason is Indox V — the amazing ceramic magnet material used by Stearns exclusively in tramp iron separation equipment.

The Stearns Indox V drum separator is ideal for process industries where materials are conveyed in enclosed chutes and spouts.

A complete line of Stearns Indox V Drum Separators is available to match most spout systems. Call your Stearns representative, or write for Bulletin No. 1051B.

CHECK THESE FEATURES

- Uniform magnetic field strength — regardless of drum width — allows higher capacity ratings, size for size.
- Very high holding power at drum surface assures positive transport of tramp iron particles.
- Factory-sealed bearings, pre-lubricated for life.
- All-stainless steel drum, hopper plate, division piece and leveling gate for maximum wear resistance.
- Optional spouting arrangements — vertical or angular.
- Direct gear-motor drive — safer, eliminates belts, chains, sprockets and guards.
- Flanged housing mounts easily in any spouting system.
- Totally enclosed, dust-protective housing — readily modified for use in air pressure systems; no large seals required on O.D. of drum.

STEARNS MAGNETIC PRODUCTS

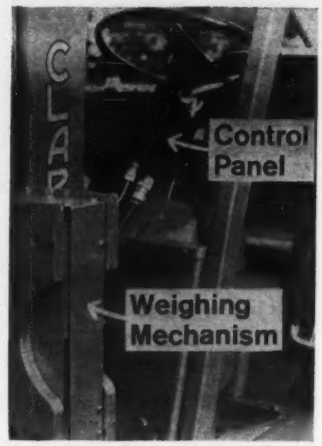
A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY

635 SOUTH 28TH STREET • MILWAUKEE 46, WISCONSIN

Check 1266 opposite last page

LATEST INDUSTRIAL TRUCK DEVELOPMENTS

. . . in design, capacity, operating features, and accessories for improved performance and safety



Weighing attachment

. . . for fork-lift trucks is accurate to 0.2% of weighing capacity. No mechanical linkages, knife edges, or moving parts are used. Accuracy is not affected by load position.

Unit utilizes a steel column rather than a spring to support load. Weight is applied to steel column in load cell. Resulting compression is sensed by strain gage and translated into pound readings.

(Baldwin-Clark weighing attachment is a joint development of Baldwin-Lima-Hamilton Corporation and Clark Equipment Company. For further information contact Industrial Truck Division, Clark Equipment Company, Battle Creek, Mich.)

Check 1267 opposite last page.

Narrow-aisle lift truck

. . . will work comfortably in aisles less than 6′ wide with normal loads. A 24v electrical system provides high lift and travel speed and capacity to work full shift under severe-duty cycle conditions. Direction indicator is mounted in hub of steering wheel.

Drive and hoist motor is series-wound, high-torque type. Direct-gear drive operates in oil bath. Polyurethane outrigger and caster wheels are standard equipment, and spring-loading of caster wheel provides positive articulation. Trucks are built capacities of 2000, 3000, and 4000.

(Yale Warehouser fork-lift truck is a product of Yale Materials Handling Division, The Yale and Towne Manufacturing Company, 11,000 Roosevelt Blvd., Philadelphia 15, Pennsylvania.)

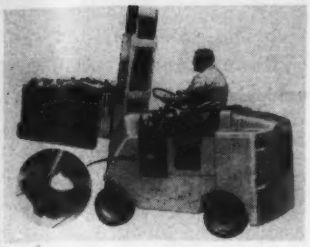
Check 1268 opposite last page.

Walkie-rider trucks . . .

. . . are maneuverable, fast, and have three separate braking systems — controlled plugging, dynamic braking, and deadman electric foot-brake.

Offered in six different models with 12-, 24-, or dual 12/24-volt electrical systems, trucks have traveling speeds ranging from 3 to 6 mph. Model "RT" trucks are products of Lewis-Shepard Products, Inc., 125 Walnut St., Watertown 72, Mass.

Check 1269 opposite last page.



Lift truck operation . . .

. . . is simplified by pedal-control power transmission which cuts down on hand movements and reduces maintenance costs and down-time. All forward and reverse movements are controlled with treadle-type pedal operated by left foot — a simple heel-and-toe action. According to company engineers, even normal braking can be done by simple operation of drive pedal — with a little practice.

Two constant-displacement pumps, driven by conventional gasoline engine, provide flow of hydraulic oil under pressure to two positive-displacement piston-type motors, which in turn furnish power to each of the drive wheels. Two hydraulic pumps, powered by the engine, also furnish hydraulic power for lifting and tilting. Towmostatic drive truck is development of Towmotor Corp., 1226 East 152nd St., Cleveland 10, Ohio.

Check 1270 opposite last page.

Two-speed power shift

. . . is offered as optional equipment for pneumatic-tire lift trucks. Transmission is hydraulic-shift, constant-mesh unit with integral torque converter. Two speed ranges forward and two reverse are operator-selected by levers.

Torque converter automatically adjusts power output to meet conditions within each range. Variable-flow cooling oil under pressure keeps all elements at proper operating temperature.

(Two-speed, power-shifted Hystamatic transmission is a product of Hyster Company, 2902 N.E. Clackamas Street, Portland 8, Ore.)

Check 1271 opposite last page.

HOW **VISQUEEN** TRADE MARK FILM HELPED SOLVE ONE OF THE WORLD'S TOUGHEST PACKAGING PROBLEMS . . . WITH MONEY TO SPARE

"We turned difficulties to opportunities," says Marketing Director John Trytten of Nitragin Co., Inc., Milwaukee, Wisconsin—"thanks in good part to the superior quality and versatility of VISQUEEN polyethylene film.

"THE PRODUCT: 'NITRAGIN' live bacterial inoculant for legume seeds.

"THE PROBLEM: Seal live bacteria to retain longevity, high moisture content. Avoid price increase.

"THE SOLUTION: Our new formula for 'NITRAGIN' innoculant ordinarily would occasion a price increase. We avoided it by manufacturing economies—and VISQUEEN film.

"We cut packaging material costs 50%. Reduced carton costs 15% because packages of VISQUEEN film permitted use of smaller cartons that took up 30% less space. We reduced capital tied up in packaging material.

"The package of VISQUEEN film retains critical moisture better—prolonging bacterial longevity.

"A date strip on the back of the package provided an easier, surer way of dating the perishable product.

"We cut distributor freight costs—got more packages in each truckload . . . and we cut shipping damages.

"Because of the 'NITRAGIN' moisture-seal package, consumers get a fresher product, easier opening and disposal on the farm."

FOR CREATIVE PACKAGING THAT CUTS COSTS CALL ON THE MEN FROM VISKING COMPANY

information request tag
VisQueen
Trade Mark
clip this tag CP4
attach to letterhead, mail.

VISQUEEN *film—first and foremost polyethylene film.*
A product of the long experience and outstanding research of
PLASTICS DIVISION
VISKING COMPANY *Division of* UNION CARBIDE *Corporation*
6733 West 65th Street, Chicago 38, Ill.
In Canada: VISKING COMPANY DIVISION OF UNION CARBIDE CANADA LIMITED, Lindsay, Ontario.
VISQUEEN, VISKING and UNION CARBIDE are registered trademarks of Union Carbide Corporation.

Check 1272 opposite last page

WITH

TAYLOR-WHARTON

The flexibility of MOBILIZED GAS STORAGE can now be yours with low-cost Taylor-Wharton Gas Transports. With these mobile storage units, you can eliminate the expense of charging remote permanent storage systems and greatly reduce initial cost and maintenance.

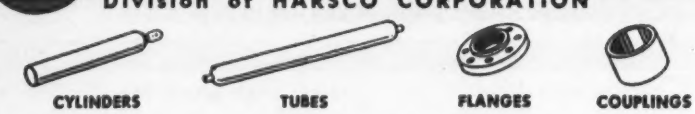
The heart of the Transport is a group of Taylor-Wharton seamless steel pressure vessels. Their quality, established by closely controlled manufacturing processes and rigorous inspection, makes the Taylor-Wharton Transport a sound investment in durable, up-to-date equipment. All vessels are normalized for extra safety and manufactured to I. C. C. 3A2400 specifications. Available in capacities of 38,500 to 56,000 cubic feet, the vessel groups are rigidly mounted on modern single or tandem-axle trailers. A weatherproof rear housing protects the valve and manifold system.

Catalog No. 58 gives complete details on this practical system for flexible gas storage. Write for it today.

More than a Century in Harrisburg 24, Pa.

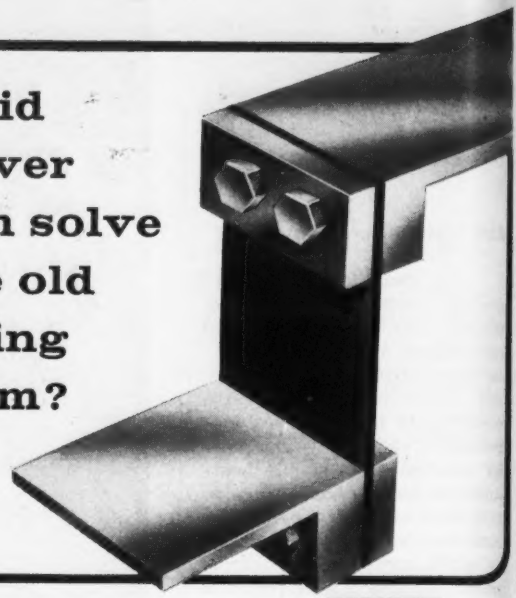
H HARRISBURG STEEL CO.

Division of HARSCO CORPORATION



Check 1273 opposite last page

How did this lever system solve an age old weighing problem?



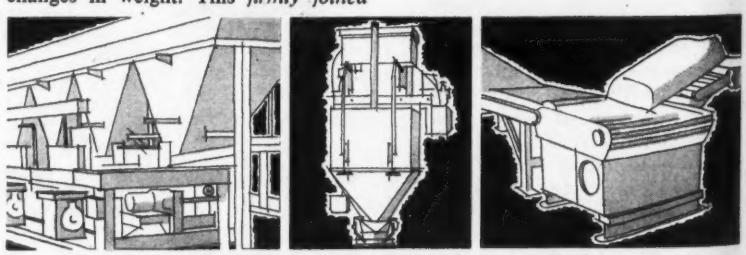
Early man was aware of the progressive inaccuracies of his pivot balance scales . . . but none knew how to remedy the situation.

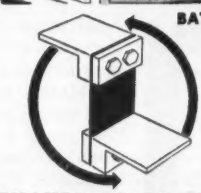
The problem was solved in 1956 when the United States issued a patent for a "Thayer Flexure Plate" Leverage System. A team of engineers and businessmen aware of industrys tremendous cumulative loss of materials in weighing operations, had devised a revolutionary new scale.

Knife-edge pivots that progressively wear and change were replaced by Thayer Flexure Plates that move only .001", yet accurately reflect the minutest changes in weight. This *firmly joined* lever withstands shocks and vibrations indefinitely. Dirt and dust are no longer a problem. Thayer guarantees this leverage system accurate for the life of the scale.

How Can It Save You Money Year After Year?

Working in conjunction with straight electrical controls, it forms the most reliable, low maintenance system ever devised to control processing or materials handling *by weight*. Literature on its application to filling, batching and checkweighing operations is available on request.





THAYER SCALE

AUTOWEIGHTION SYSTEMS FOR FILLING, BATCHING AND CHECKWEIGHING

THAYER SCALE CORP. • 6 THAYER PARK, PEMBROKE, MASS.

Check 1274 opposite last page

Palletless freight-handling trailer developed

Uses: For palletless freight handling.

Features: Trailer eliminates need for pallets and sharply reduces handling time in outbound operation.

Description: Freight is loaded onto trailer coupled to train. Tractor tows train to loading docks, where multiple-fork lift truck removes freight from trailer and carries it into delivery trucks.

Multiple forks slip between raised ribs on bottom of trailer, making lifting of load easy and rapid

Raised ribs on bottom of trailer are so spaced that slots in fork slip between them, enabling load to be raised quickly and easily. When freight reaches delivery trucks, it is automatically shoved off forks by hydraulic pusher unit.

Made of steel, trailer has molded-on rubber or steel wheels and steel automatic couplers.

(Trailer is manufactured by SI Handling Systems, Inc., P. O. Box 70, Easton, Pa.)

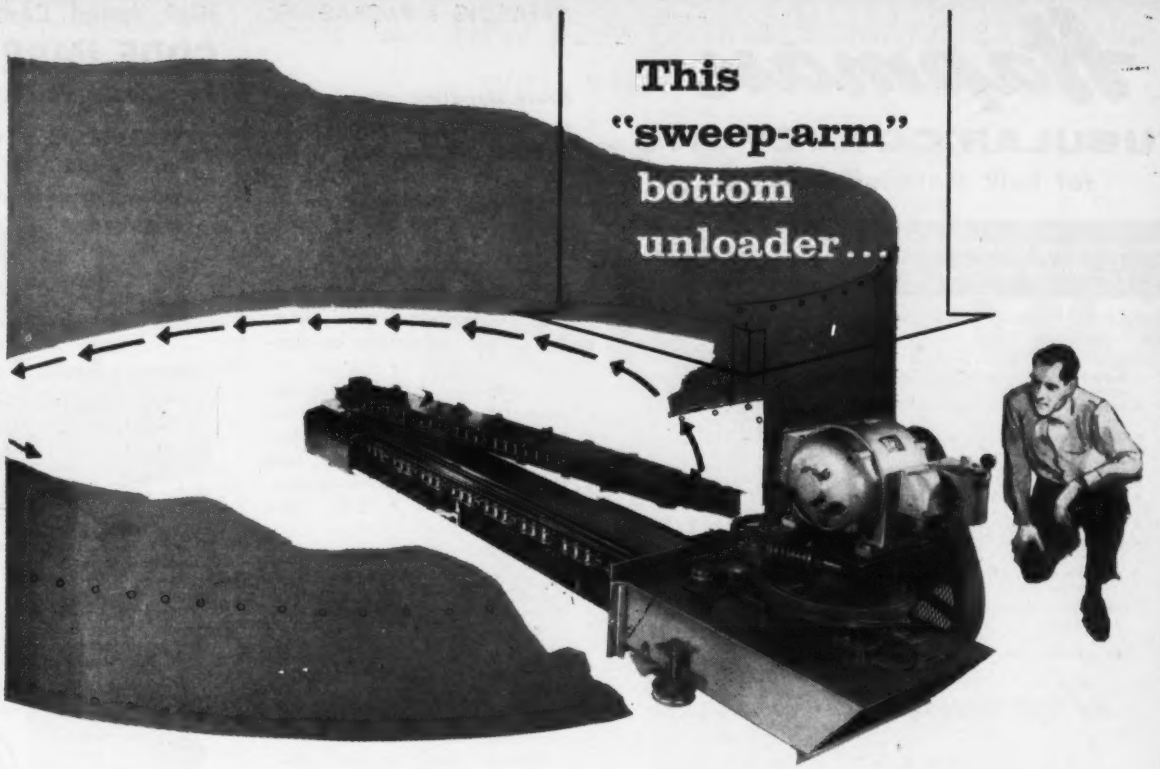
Check 1275 opposite last page.

Live-bottom bins to facilitate efficient discharge are covered in two-page technical data sheet. Bul 1048-1 —Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 1276 opposite last page.

Package-opening tape's use is described in eight-page booklet. "How to Use Zip-Tape" — The Dobeckmun Company, A Division of The Dow Chemical Company, 3301 Monroe Ave., Cleveland 1, Ohio.

Check 1277 opposite last page.

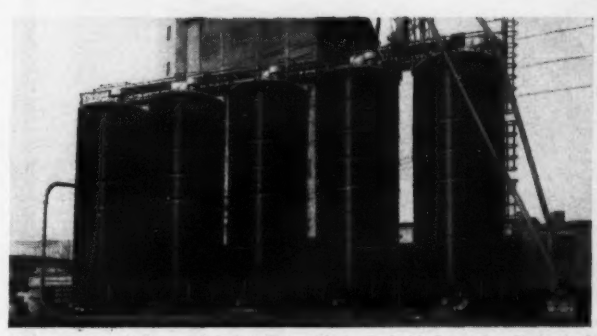


is the key to a completely mechanized materials-handling system

Exclusive with Permaglas® Mechanized Storage Units,

the mechanical sweep-arm bottom unloader provides the first *reliable* method for automatically discharging bulk materials into your conveying system, on a first in first out basis. Result: substantial labor savings — elimination of costly bags, bins, barrels, fork trucks and the expense of maintaining this equipment.

If your operation involves the storage or movement of granular, flaky or pulverized; hygroscopic, corrosive or contaminable; edible or non-edible or hard-to-handle bulk materials — it will pay you to see how Permaglas Units can mechanize the storage of these materials. For more details on these unique structures and the operation of mechanical sweep-arm bottom unloader, mail coupon below.



Modernize your bulk materials handling with A. O. Smith Permaglas Mechanized Storage Units. In the totally enclosed Permaglas Mechanized Storage Unit System shown above, incoming bulk materials are conveyed directly into the Permaglas Unit. Sweep-arm bottom unloaders discharge material into the pneumatic conveying system which delivers it to to the processor's line.

Further, these unique steel structures — glass-protected inside and out* — are completely sanitary, provide contamination-free storage and require a minimum of maintenance!

*HYDRASTEEL — Process covered by U.S. Patent No. 2,754,222

Through research ... a better way

A.O.Smith

HARVESTORE PRODUCTS
Kankakee, Illinois,
A. O. Smith INTERNATIONAL S.A., Milwaukee 1, Wis., U.S.A.

A. O. Smith Corporation, Dept. CP-49, Kankakee, Ill.

Please send me, without obligation, information on how Permaglas Mechanized Storage Units can be the *HEART* of my materials handling system.

I am particularly interested in the movement and storage of: _____

Name _____ Title _____

Company _____

Address _____

City _____ Zone ____ State _____

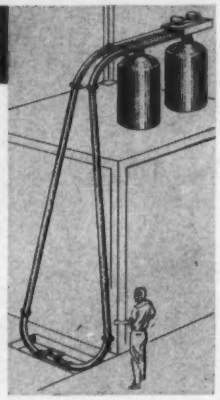
Check 1278 opposite last page

Hapman

TUBULAR CONVEYORS

for Bulk Material Handling

Move almost any flowable material wet or dry — through any plane or angle



Sealed Pin Chain Design Keeps Abrasives Out — Quadruples Chain Life

- **Sealed** casing retains liquids, gases, powders
- **Basically** self supporting, self feeding, self cleaning
- **Degradation** and cross contamination minimized
- **Multiple** discharge and receiving points
- **Minimum** space required for installation
- **Functions** as volumetric feeder
- **Low** maintenance and operating costs
- **Wide** range of materials available for fabrication

...each application engineered for your needs.

For additional information call . . . write . . . wire

Hapman CONVEYORS, INC.
630 Gibson St.
KALAMAZOO MICHIGAN
Fireside 3-1675

Check 1279 opposite last page

Store or ship your products in

Ellisco **CANS for CHEMICALS**

ROUND SLIP COVER CANS
May be tape sealed if air tight closures are required.

a wide range of styles, shapes, and sizes offer

POSITIVE PROTECTION

The variety of sizes and types of ELLISCO cans available to package your dry, semi-liquid or liquid products is almost as great as their uses. These popular containers are available in square, rectangular or round types with snug-fitting slip covers, single friction or double friction plugs, or screw caps to seal contents in, dust and moisture out.

ROUND CANS: ¼" to 17⅛" Diameters. 1½" to 30" Body Heights.
SQUARE CANS: 2¼" x 2¼" to 11½" x 11½" Base Dimensions. 2" to 12" Body Heights.
RECTANGULAR CANS: 2½" x 1¾" to 7¼" x 5⅛" Base Dimensions. 2" to 12" Body Heights.

Many types and sizes are available from stock. Special shapes and sizes can be made to order. Write, wire or call for full details.

LITHOGRAPHED CANS
Cans of all shapes and sizes may be lithographed in your design and color combinations.

ROUND CORNERED, SQUARE AND RECTANGULAR CANS

GEORGE D. ELLIS & SONS, INC.
4018 N. AMERICAN ST., PHILADELPHIA 40, PA.
BAldwin 3-3405

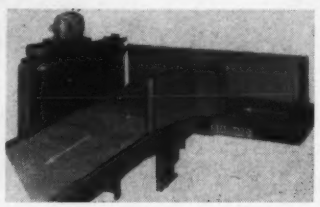
Check 1280 opposite last page

Drum handling attachment moves, tiers containers without using pallets

Clamping mechanism can be adjusted from 35" to 14"

Uses: For engaging, transporting, placing, and tiering any conventional-type drum without using pallets or dunnage.

Features: Clamping mechanism of mechanical unit can be used on any of manufacturer's line of electric fork trucks. Mechanism is adjustable from 35" to 14". Thus



Separate drives for feed, takeaway, and vertical belts cut diverter's maintenance costs

gles to each other. A short vertical belt is mounted across end at right angle to feed belt and parallel to takeaway belt. Vertical belt assists in turning material and completing transfer.

(Air Service Diverter is development of Standard Conveyor Co., North St. Paul 9, Minnesota.)

Check 1281 opposite last page.

Hand truck that tilts, easily handles 1000-lb loads

Uses: Hand truck designed for heavy loads, particularly bagged materials stored on pallets.

Features: Unit easily tilts loads as heavy as 1000 lb, and is available with two-wheel safety brakes.

Description: Truck is equipped with special shoe which automatically locks it into tilting position as unit is moved vertically against load. This permits tipping action to be accomplished with minimum of effort.

Constructed either of alumi-

High-speed, Conveyor-line

CODE IMPRINTER

for cans, jars, bottles

Fits in minimum space on any line... no line-cutting or dead plates required

Imprints flat, concave, deeply recessed surfaces

•

BOOTH 550 PACKAGING SHOW

Fully automatic MARKOCODER® machine is a versatile packaging line attachment for imprinting *bottoms* of cans, jars, bottles, canisters, paper containers at speeds up to 600 per minute. Keeps products flowing smoothly. Makes consistently clean imprints from rubber type and fast drying fluid ink. Designed for quick code changes, simple maintenance, easy adjustment for different size cans. Install it yourself in a few hours.

Top-coding attachments also available

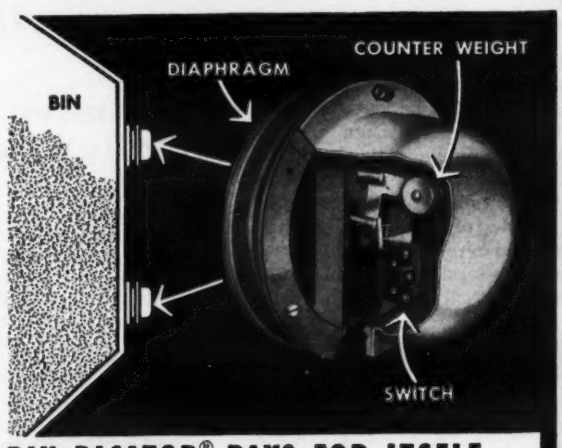
Write today for Bulletin "TB"

First and foremost in automatic production-line CODING, MARKING and IMPRINTING machines — **Gottscho®**

GOTTSCHO Dept. W
HILLSIDE 5, N. J.

In Canada: Richardson Agencies, Ltd. - Toronto & Montreal

Check 1282 opposite last page



BIN-DICATOR® PAYS FOR ITSELF FIRST TIME IT PREVENTS BIN OVERFLOW, CONVEYOR CLOG, ELEVATOR CHOKE-UP, MACHINERY DAMAGE, REPAIR SHUT-DOWN

If you handle bulk material you probably need Bin-Dicators. The nominal cost of this protection and automatic control makes it the lowest-cost modernization you can buy. Available with Explosion-Proof Switch.

THE BIN-DICATOR CO.
13946-D Kercheval • Detroit 15, Mich.

Write for free copy of catalog BD-15 or call VAlley 2-6952

WE SELL DIRECT • PHONE ORDERS COLLECT

Check 1283 opposite last page

num pipe or heavy-gage steel tubing, truck is equipped with 10" replaceable hard-rubber-tire or pneumatic ball-bearing wheels.

(Ezy-Tilt pallet truck is manufactured by Valley Craft Products, Inc., a division of O'Neil-Irwin Mfg. Co., 770 Jefferson Ave., Lake City, Minnesota.)

Check 1284 opposite last page.

Boxboard container OKd for shipping nitric acid in one-trip bottles

Plastic foam filling prevents combustion in carton

A boxboard container which has compartments made of two layers of kraft into which plastic foam filling is sandwiched has been approved for shipping non-returnable glass bottles of reagent nitric acid.

Interstate Commerce Commission has granted special permission for use of the container. It was developed jointly by St. Regis Paper Co. and Du Pont's Grasselli Chemicals Department, and is designed for packaging one- and five-pint bottles.

Special permit has been granted to use this box-board carton containing plastic foam-filled compartments for shipping non-returnable glass bottles of reagent nitric acid

Foam filling prevents combustion, a hazard normally associated with ordinary corrugated board which ignites when the acid comes in contact with it.

Reported to offer "100% more protection than a wire-bound wooden crate," container can survive a 4-ft fall onto concrete without breaking. Board will not absorb water, and so is well able to withstand outside storage.

ICC approval marks one of the first instances in which single-trip, one-pint bottles of this chemical have been offered for sale. Deposits are eliminated, as well as extra handling required by returnable types.

Shipping weight is reduced approximately 3 lb per carton, thus lowering freight costs. Unit is smaller than wooden crate, permitting easier stacking and substantial saving in warehouse space.

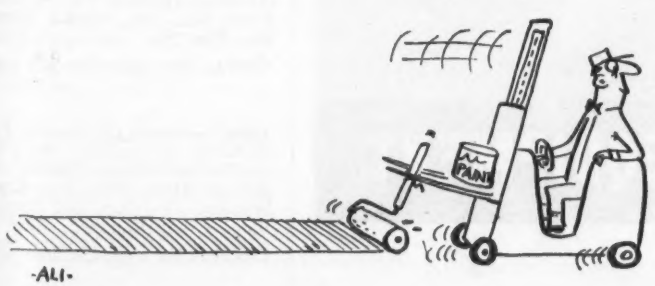
Outer surfaces of container are treated with colloidal silica, an anti-skid agent.

(Fome-Cor container is manufactured by St. Regis Paper Company, 150 East 42nd St., New York 17, N. Y.)

Check 1285 opposite last page.

(Reagent nitric acid packed in Fome-Cor containers is sold by Grasselli Chemicals Department, E. I. du Pont de Nemours & Company, Wilmington 98, Del.)

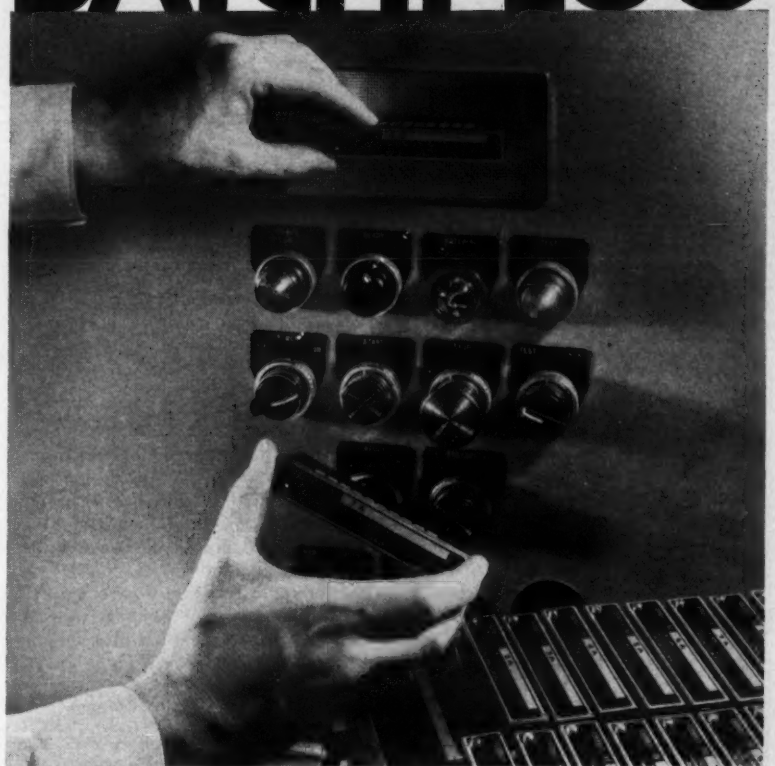
Check 1286 opposite last page.



-ALI-

NEW LOW COST AUTOMATIC BATCHING
WITH INSTANT FORMULA CHANGING

HOWE BATCHPLUG



1 Quickly and easily adjusted to accurate settings.
2 Each standard Batchplug controls up to 10 ingredients, 3 scales.
3 Sealed for privacy—no dials to reset—no operator error.
4 Inserting Batchplug changes entire plant to new formula instantly.

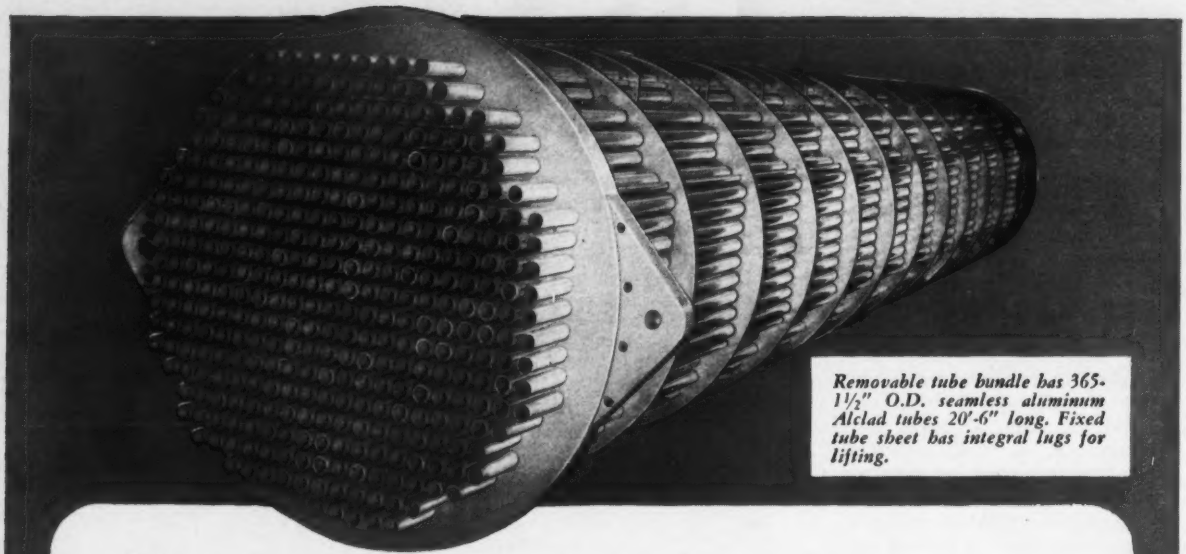
The Howe BATCHPLUG cuts panel and circuit costs—puts automatic batching in everybody's reach! Simple, rugged, easily set for any formula up to 10 ingredients. An exclusive Howe development!

HOWE
THE HOWE SCALE CO. • RUTLAND, VT.
A SUBSIDIARY OF SAFETY INDUSTRIES, INC.

WRITE TODAY FOR OFFICE DEMONSTRATION OR NEW BATCHPLUG FOLDER

Check 1287 opposite last page

All Aluminum
DUAL PURPOSE ABSORBER-COOLER

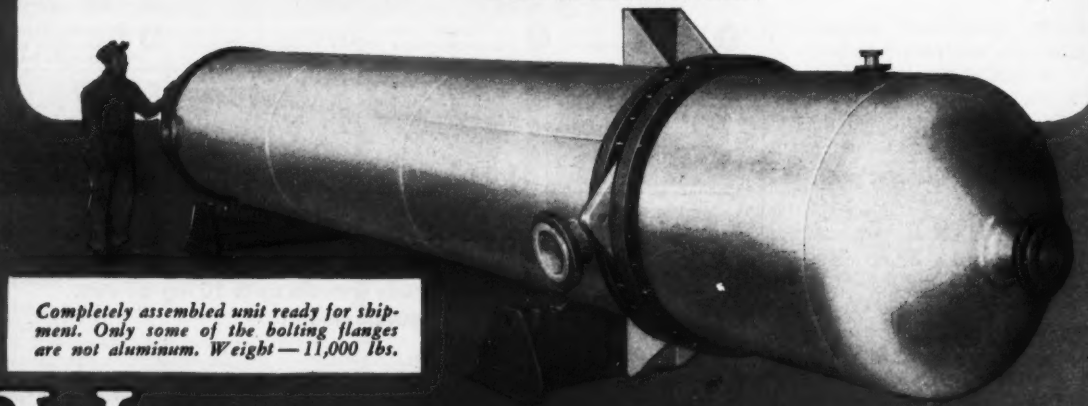


Removable tube bundle has 365-1½" O.D. seamless aluminum Alclad tubes 20'-6" long. Fixed tube sheet has integral lugs for lifting.

Two units like this were built for an AMMONIA FERTILIZER PLANT. Operating in a vertical position, they are unique in that they serve a dual purpose.
A nitrogen solution is directed downward in uniform film flow, on the inside of the tube walls. At the same time ammonia vapor is introduced in the stream. The nitrogen solution, cooled as it travels in film flow down the tubes, *at the same time absorbs ammonia* from the vapor flowing thru the center core of the tubes.
Cooling water in the shell, baffled to direct the flow for maximum efficiency within pressure drop limitations, removes the sensible heat and the heat of reaction of the nitrogen solution. Perhaps combination units like this would solve your cooling-absorption problem. Discuss it with our engineers, without obligation. *Address Dept. 24A-XCP*

HENRY VOGT MACHINE CO., LOUISVILLE, KY.

SALES OFFICES New York, Chicago, Cleveland, Dallas, Camden, N.J., St. Louis, Charleston, W.Va., Cincinnati



Completely assembled unit ready for shipment. Only some of the bolting flanges are not aluminum. Weight — 11,000 lbs.

Vogt HEAT TRANSFER EQUIPMENT

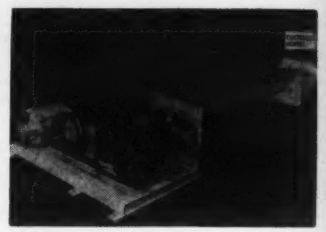
Check 1288 opposite last page

Bulk screw-feeder bolts to base of hopper

Uses: Bulk-feeding from hopper.

Features: Self-contained unit can be simply bolted to base of existing hopper in plant.

Description: Line covers range from zero to 3000 cfh of dry granular material. It consists of a totally enclosed motor, reducer, drive, guard, screw, and housing with flanged inlet and outlet.



Bulk screw-feeder is self-contained, can be bolted to base of customer's hopper

Variable-speed drive is furnished—with range from zero to maximum rating—where rate of feed is critical or must be varied.

Unit comes in three styles. General Purpose is made of carbon steel. Corrosion Resistant uses Type 304 stainless steel for all parts in contact with material. Sanitary, also of 304 stainless steel, is built for easy disassembly and cleaning.

(Self-contained bulk Screw-feed is product of M-H Standard Corporation, 517 Communipaw Ave., Jersey City 4, N. J.)

Check 1289 opposite last page.

Permanent-magnetic pulleys are cataloged in bulletin. Size range of 4 through 30" diam in various belt widths is covered in Permanent-magnetic Pulley Bul—Eriez Mfg. Co., 73-RB Magnet Dr., Erie, Pa.

Check 1290 opposite last page.

Table conveyors are illustrated and explained in brochure which also details specifications. Model 1050 Bul — Dept. TV, The Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.

Check 1291 opposite last page.

Dust and moisture unable to free bag contents

Tape-over-sewn bag closure provides positive seal

Uses: Sealing of both ends of bags for ammonium nitrate, ammonium sulfate, and other products requiring maximum moisture protection.

Features: Tape-over-sewn bag closure is impervious to effects of moisture. Presence of dust during sealing does not reduce quality of bond.

Description: Special tape, adhesive, and method of application are utilized to produce bag seal. Closures are applied at such speed that heat does not scorch paper or melt a poly-coated inner sheet.

Moisture does not penetrate needle holes, thus eliminating pencil point hardening of material at closure.

Multi-wall paper bags with special seal are available, or sealing unit can be obtained to perform operation in production line.

(Paper bags with Moistite closure and Moistite bag-closing units are products of Chase Bag Company, 155 East 44th Street, N.Y. 17, N.Y.)

Check 1291A opp. last page.

Reduction in damage

. . . caused by abrasion during loading and transporting of pails which have lithographed, decorated, or paint finishes is accomplished by plastic handle grip developed for steel shipping pails. Grip is resilient and will not break or splinter. Nor will it scratch, dent, or mar pail. It's designed with nine tiny, full-length air passages to provide comfortable, cushioned grip. Material is non-absorbent and will not retain or transfer poisonous or corrosive material.

(Plastic handle grip is development of Vulcan Containers, Inc., Congress Street Expwy. and Mannheim Rd., Bellwood, Illinois.)

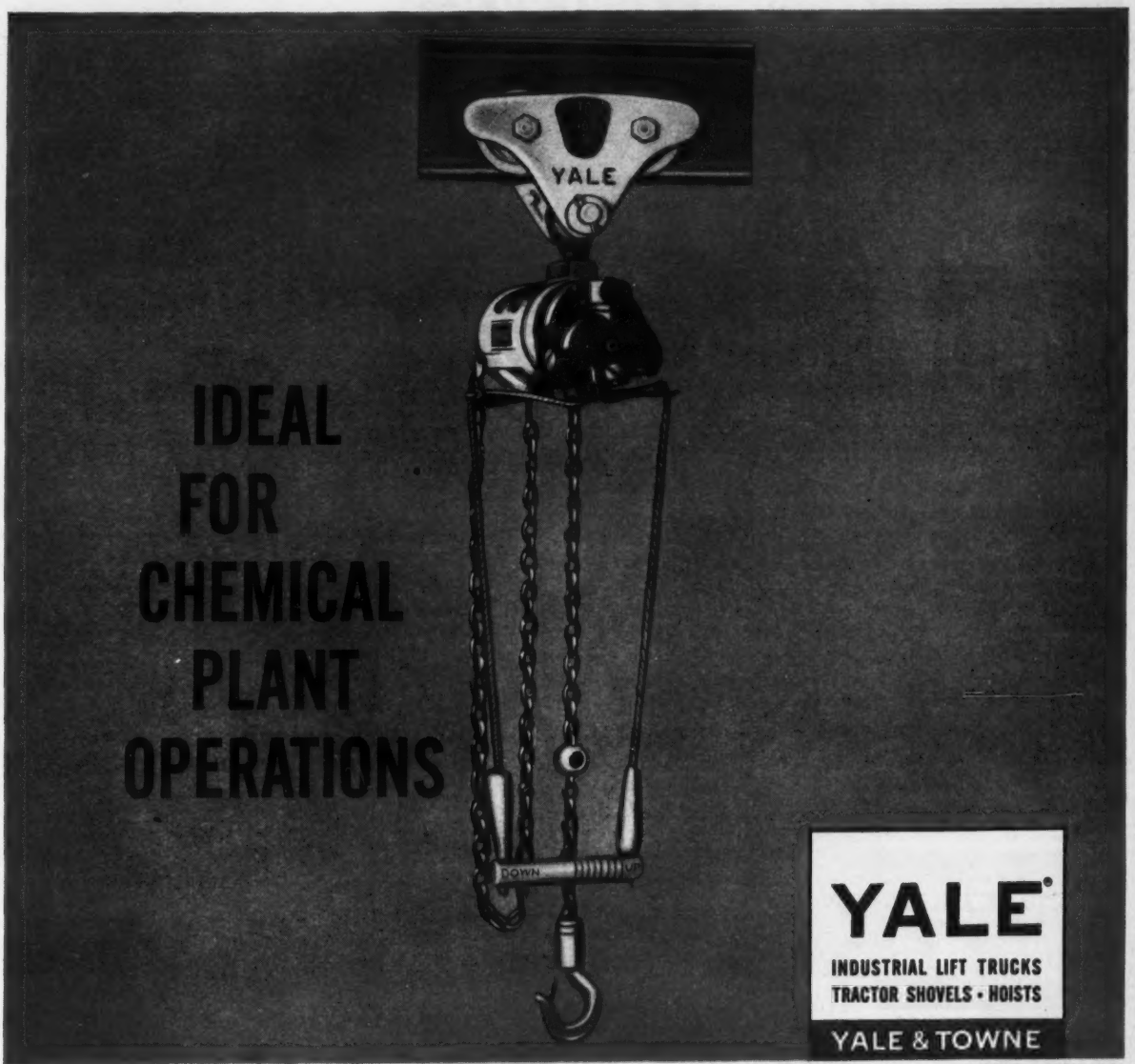
Check 1291B opp. last page.

NEW YALE AIR HOISTS PROTECT AGAINST EXPLOSION

The new Yale Air Hoists provide the margin of safety you need for overhead handling in a hazardous atmosphere. Air motor is explosion-proof—will not overheat—ideal safety factors for chemical plant operations.

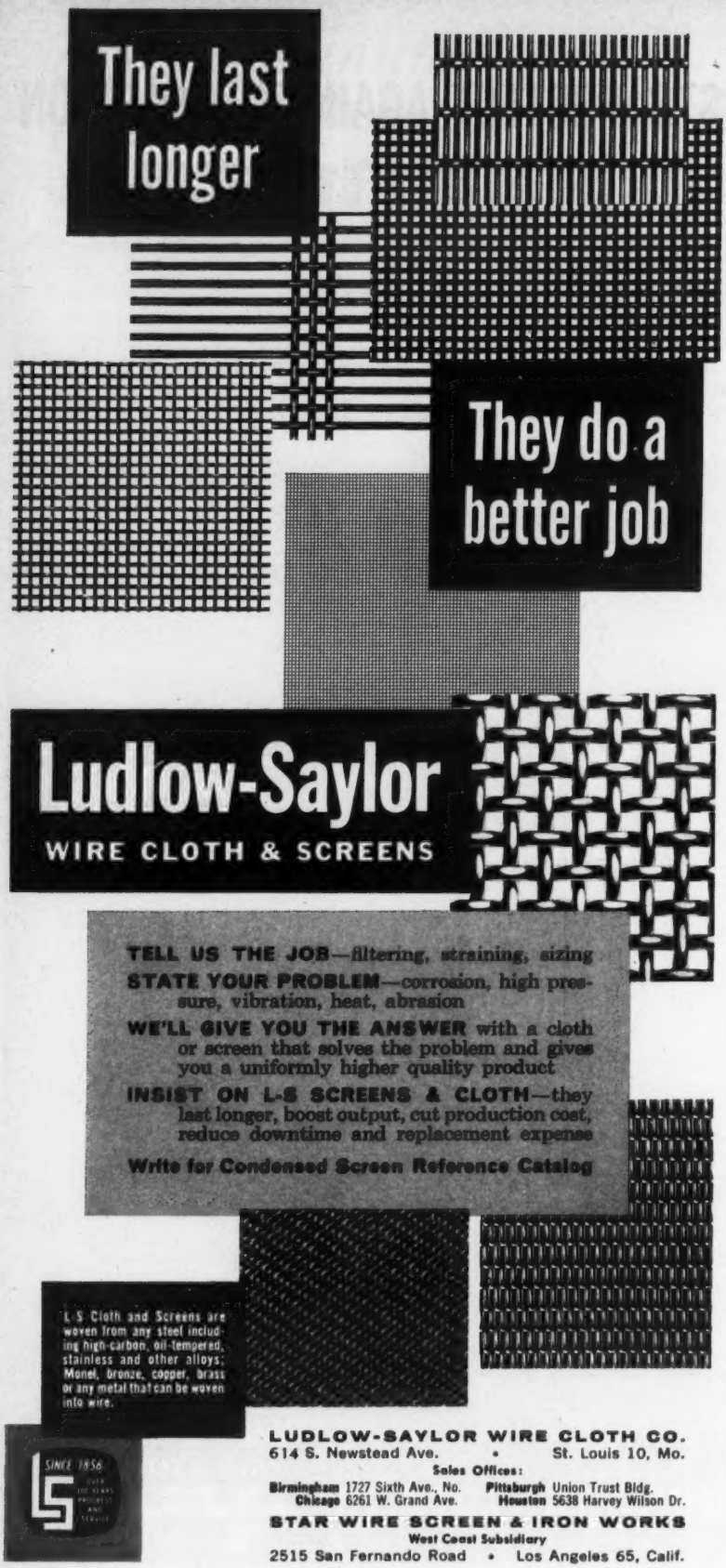
Danger of spillage and product damage is lessened, too—constant variable speed control provides smoother lifting and lowering factors. These light, compact hoists—with instant-acting, heavy-duty brake—provide almost silent operation. Motor cannot burn out from overloads or high duty operation. Maintenance is minimized because of fewer moving parts, a real economy feature.

Capacities: ¼ to 1 ton—hook or trolley models—roller or link chain—pendant or pull-cable control. For complete information, contact your Yale distributor listed under "hoists" in the yellow pages of your phone book. Or write for brochure #5145 to The Yale & Towne Manufacturing Company, Yale Materials Handling Division, Dept. AH3-V, Philadelphia 15, Pennsylvania.



Yale Materials Handling Division, a division of The Yale & Towne Manufacturing Company. **Manufacturing Plants:** Philadelphia, Pa., San Leandro, Calif., Forrest City, Ark. **Products:** Gasoline, Electric, Diesel and LP-Gas Industrial Lift Trucks • Worksavers • Warehousers • Hand Trucks • Industrial Tractor Shovels • Hand, Air and Electric Hoists

Check 1292 opposite last page


They last longer
They do a better job
Ludlow-Saylor
WIRE CLOTH & SCREENS
TELL US THE JOB—filtering, straining, sizing
STATE YOUR PROBLEM—corrosion, high pressure, vibration, heat, abrasion
WE'LL GIVE YOU THE ANSWER with a cloth or screen that solves the problem and gives you a uniformly higher quality product
INSIST ON L-S SCREENS & CLOTH—they last longer, boost output, cut production cost, reduce downtime and replacement expense
Write for Condensed Screen Reference Catalog
L-S Cloth and Screens are woven from any steel including high-carbon, oil-tempered, stainless and other alloys; Monel, bronze, copper, brass or any metal that can be woven into wire.
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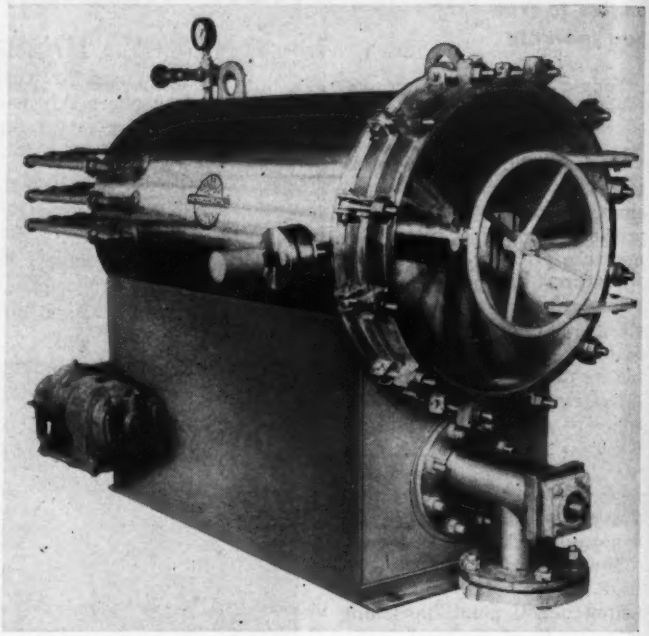
LUDLOW-SAYLOR WIRE CLOTH CO.
614 S. Newstead Ave. • St. Louis 10, Mo.
Sales Offices:
Birmingham 1727 Sixth Ave., No.
Chicago 6261 W. Grand Ave.
Pittsburgh Union Trust Bldg.
Houston 5638 Harvey Wilson Dr.
STAR WIRE SCREEN & IRON WORKS
West Coast Subsidiary
2515 San Fernando Road • Los Angeles 65, Calif.

Check 1293 opposite last page

cp PROCESSING EQUIPMENT



Dual performing filter

Has plate-rotating mechanism that quickly converts unit from horizontal- to vertical-plate filter. Permits combining cake-stability advantage of former with ease-of-cake-removal advantage of latter. Screw conveyor automatically discharges cake

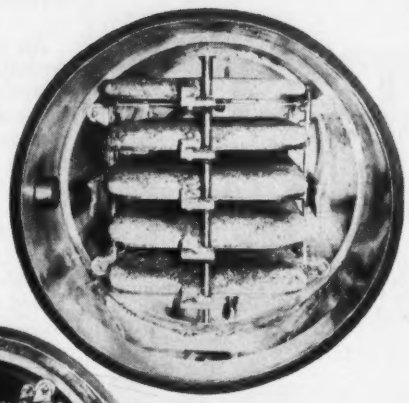
Uses: Filter is particularly well suited for filtering toxic, volatile, or other hazardous materials. Unit is also recommended for applications where products must be kept free from outside contamination.

Features: Unit combines advantages of horizontal-plate filters with those of vertical-plate units. Complete, automatic cake removal is possible without need for opening filter. Except for occasional inspection, unit seldom, if ever, has to be opened.

Description: Pressure-type filter is totally enclosed and can be equipped with electronic controls for completely automatic operation. Precoating and filtration steps are performed with plates in horizontal position. This assures maximum cake stability, minimum cracking, and removes danger of cake slipping.

At end of filtration, cake is blown dry with 10-15 psi air or gas. Plates are then mechanically rotated to vertical position. Cake is knocked off plates by tapping (with hammer) external agitator bar. If desired, a vibrator can be installed for this purpose. Dislodged cake drops to screw conveyor at bottom of filter and is discharged from unit. Entire cleaning cycle takes about 20-30 minutes.

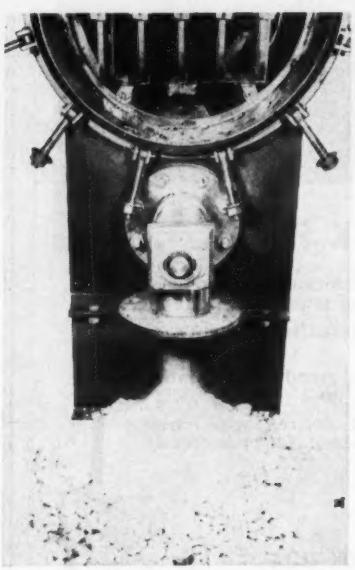
Filter is equipped with individual plate shutoff valves and sight glasses. This makes



1

Horizontal-plate filter never needs to be opened to remove cake. Screw conveyor (bottom) discharges cake from unit. Wheel at front of filter rotates plates to vertical position

2



3

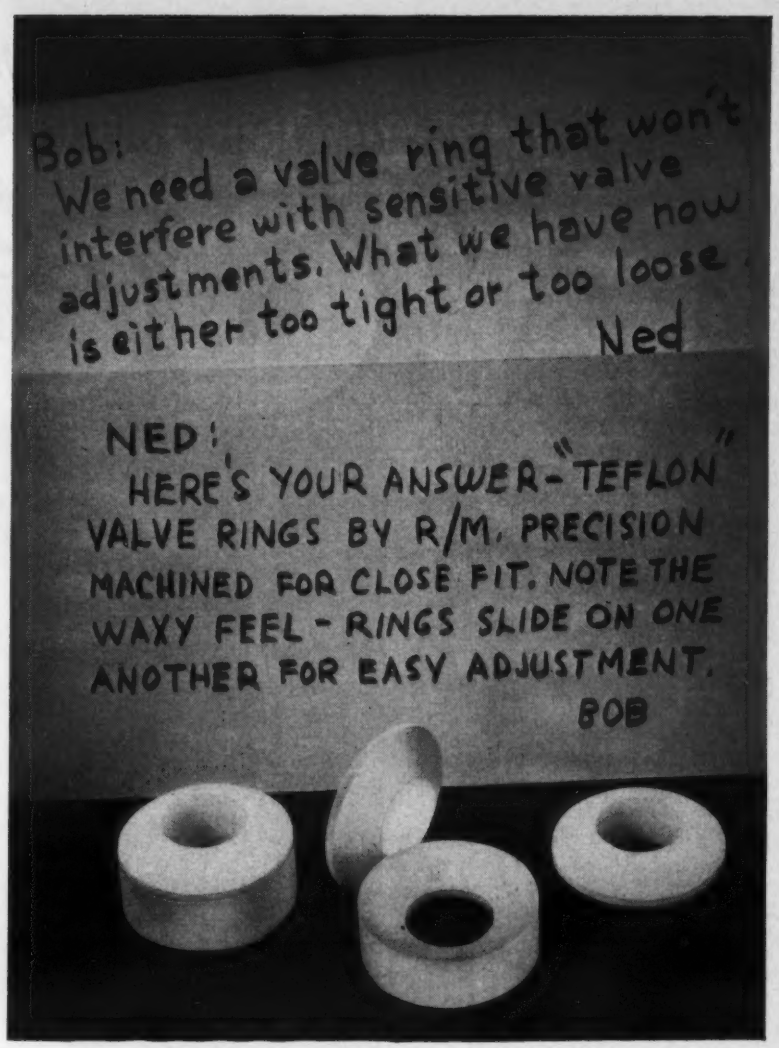
Here's how filter works: 1) Plates are in horizontal position for precoating and filtering operations. 2) After filtration ceases, plates are rotated to vertical position for cleaning. 3) Spent cake, having fallen off plates, is discharged from filter by screw conveyor

it possible to blow cake completely dry with minimum amount of air or gas. Screw conveyor is operated by electric motor. Conveyor action helps break up cake and discharges it as dry powder.

Filters can be constructed in various sizes up to 600-sq ft filtering area. Standard units are designed to withstand 60 psi pressure, but filters can be built to withstand higher pressures if desired. Fabrication may be from any workable metal or alloy.

(Model HR filter was developed by Sparkler Manufacturing Co., Mundelein, Ill.)

Check 1294 opposite last page.


Bob:
We need a valve ring that won't interfere with sensitive valve adjustments. What we have now is either too tight or too loose.
Ned
NED:
HERE'S YOUR ANSWER-"TEFLON" VALVE RINGS BY R/M. PRECISION MACHINED FOR CLOSE FIT. NOTE THE WAXY FEEL - RINGS SLIDE ON ONE ANOTHER FOR EASY ADJUSTMENT.
BOB

"Teflon"* Valve Stem Packings are just what you need when you are making sensitive adjustments on slow moving rotary and reciprocating equipment. The precision machined rings slip on each other and exert pressure against the valve stem or rod. Because it does not react to any known chemical and has no known solvent, "Teflon" is ideal where corrosion is a problem. It has excellent nonadhesive properties—an added benefit if you are handling viscous fluids. "Teflon" Valve Stem Packings are supplied in wedge and angular type and as solid unit rings.

R/M also manufactures a complete range of homogeneous and reinforced valve stem packings engineered to meet many other requirements: high temperatures, high pressures, high speeds, temperature extremes, etc.

Feel free to call on the experienced R/M packing engineers for details and service, whatever your packing needs.

R/M MAKES A COMPLETE LINE OF MECHANICAL PACKINGS—including Vee-Flex®, Vee-Square®, Universal Plastic, and "versi-pak"®; GASKET MATERIALS; and "TEFLON" PRODUCTS. SEE YOUR R/M DISTRIBUTOR.

*A DuPont trademark

R/M PACKINGS
RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, PASSAIC, N.J.
MECHANICAL PACKINGS AND GASKET MATERIALS

RAYBESTOS-MANHATTAN, INC., Mechanical Packings • Asbestos Textiles • Industrial Rubber • Engineered Plastics Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings Brake Blocks • Clutch Facings • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

Check 1295 opposite last page

Where can this FLEXIBLE, clear, plastic tubing fit into your plans?

TYGON

✔ If you convey corrosive gases and liquids.

✔ If you convey liquid food products.

✔ If you require flexible lines with solution visibility.

Chemically-resistant, non-toxic, supple as a fly line, Tygon clear flexible plastic tubing is the ideal medium for those tough-to-solve piping problems.

Possessing a flex life ten to twelve times that of rubber, free of aging characteristics, Tygon serves equally well as a permanent component in machines or as quickly assembled and disassembled, temporary or permanent plant piping.

QUICK FACTS

Six standard formulations to meet a wide range of requirements.

Special formulations for unusual needs.

More than 50 standard sizes ranging from 1/16" to 3" ID.

Available if desired with outer braid reinforcement for pressures up to 300 psi.

THIS FREE BOOK TELLS THE COMPLETE STORY

Address:
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Plastics and Synthetics Division
The U. S. Stoneware Co.,
Akron 9, Ohio
Ask for Bulletin T-97

Plastics & Synthetics Division

U. S. STONEWARE
AKRON 9, OHIO

353-E

Check 1296 opposite last page

All-glass cartridge developed for filter

An all-glass cartridge which enables filters to be operated under 100% relative humidity has been developed by manufacturer for his line of air filters.

The cartridge has a glass board frame which serves to make filter fire-resistant. It is interchangeable with manufacturer's earlier model fiber board enclosure cartridge. A wide range of discoloration efficiency from 35% to 95% can be attained by interchanging cartridges.

(Glass cartridge for Aerosolve filters is development of Cambridge Filter Corporation, P.O. Box 1255, Syracuse 1, New York.)

Check 1297 opposite last page.

Big, speedy centrifuge . .

. . . has 48" by 30" solid basket and speed of over 1500 rpm. Reported to be the first of their size with this speed, two of the units are currently processing vegetable compounds at rate of 12 cu ft per batch. Operating cycle is less than 30 minutes. Centrifuge is completely automatic. Touch of button starts, feeds, skims, brakes, unloads, and recycles.

(Super-S-Omatic centrifugals are product of the Fletcher Works, Inc., 201 Glenwood Ave., Philadelphia 40, Pa.)

Check 1298 opp. last page.

Adjustable slide angle, variable-speed drive in screen separator

Uses: Separation of tumbling media and wide variety of processed parts.

Features: Separator has variable-speed drive adjustable loading angle. It has complete selection of interchangeable-mesh, 24 x 48″ screens.

Description: Movement of screen can be adjusted from zero to two inches, with reciprocations variable from 135 to 450/minute. Power is from 12-hp 220/440 three-phase motor. Hand-wheel speed adjustment and manual, push-button control are included. Ball bearings and nylon bushings are used in drive mechanism.

Screen separator can handle wide variety of items, has complete selection of interchangeable screens

SS-3L model, shown in photo, has straight-through front-to-back operation. SS-3S model has front-loading and front-discharge for small-space installations. Height to top of cradle is 66″ above floor.

(Screen separators are product of Rampe Manufacturing Co., 14915 Woodworth Ave., Cleveland 10, Ohio.)

Check 1299 opposite last page.

NEXT MONTH

Flash drying of corn starch — and what it has achieved at Corn Products Refining at Argo, Illinois — is theme of an article appearing in next month's New Solutions section.

Now . . . an old company presents a new face . . . an image . . . a dynamic trademark to match the many changes that are making Titeflex the most progressive company in the flexible hose business

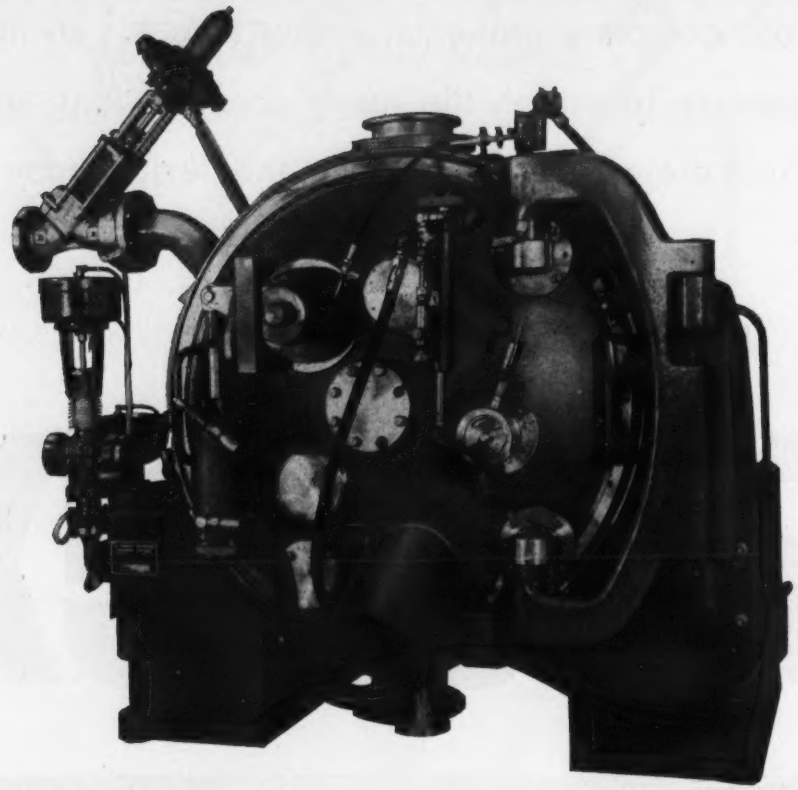
titeflex

titeflex incorporated springfield 4 massachusetts

PACIFIC DIVISION • SANTA MONICA, CALIFORNIA 9196

Check 1300 opposite last page

The new Sharples C-41 Super-D-Hydrator



Another Sharples Exclusive

Easily Handles Polyolefins and other difficult Purifications

Slow draining compressible fine solids . . . high purity essential . . . segregation of rinse liquor from mother liquor required . . . multiple washing with various rinse materials . . . volatile mother and rinse liquor . . . continuous operation under pressure . . . high capacity . . .

The C-41 Super-D-Hydrator is the centrifuge that meets the stringent requirements of polyolefins and similar materials.

By applying high centrifugal force to a thin layer of crystals, and by controlling exactly the thickness of the cake, compaction is prevented and the crystal layer quickly gives up its liquid content . . . maximum use is made of rinse liquors in minimum time . . . because washing rinses are applied sequentially, separation of the mother liquor from various wash materials such as hydrocarbons, water, solvents, etc., is readily accomplished in the effluent piping . . . volatile materials are handled in the pressurized design without loss or hazard . . . controlled high speed unloading efficiently handles the pure, dry crystals and automatically prepares the basket screen for the next load . . . capacity on polyolefins is from 1 to 3 tons of dry solids per hour (up to 24 tons/hour in such materials as free draining ammonium sulphate).

The C-41 Super-D-Hydrator has been designed with the future in mind . . . and is proving today its exceptional performance on production lines in the field.

If high purity and increased capacity at minimum operating cost are requisites, let us tell you how the Super-D-Hydrator fits into your plans.

THE SHARPLES CORPORATION

2300 WESTMORELAND STREET / PHILADELPHIA 40, PENNSYLVANIA

NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • HOUSTON • SAN FRANCISCO • LOS ANGELES • ST. LOUIS • ATLANTA

Associated Companies and Representatives throughout the World

Check 1301 opposite last page

In high-capacity sifter, three-part construction simplifies cleaning

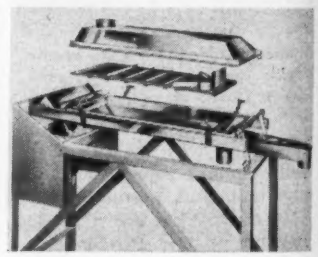
Only screen motion sifts for sanitary operation

Uses: Sifting of materials requiring high purity, such as pharmaceuticals.

Features: Sifter has variable capacity, adjustable up to equivalent of 4000 lb/hr of non-fat milk powders. It is of simple, three-part construction. This permits quick, easy screen cleaning and/or replacement.

Product contamination is reduced due to screen-motion-only sifting operation. No other means of agitation are utilizied.

Description: Field testing indicates that tailing losses with sifter can be reduced 75% compared to those using conventional sifting operations. Sifter operates without clogging, even with high-moisture-content products.



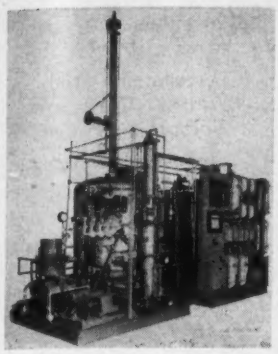
Simple, three-part construction of sifter permits quick, easy cleaning and/or screen replacement

Pan and cover are constructed of 20-gage stainless steel. Stand is made of 2-½" angle iron, undercoated with rust-inhibitor paint. A 24-mesh screen is standard.

Over-all size of unit is approximately 7' long by 2½' wide. Screen movement is provided by elliptical motion at discharge end and circular action at other end. Totally enclosed 1/3-hp motor operates on three-phase, 220/440-v, 60/50-cy power supply.

(Cirlyptic sifter is product of Hobam Inc., 1720 Military Rd., Buffalo, N.Y.)

Check 1302 opposite last page.



Water-treatment system

. . . was fully preassembled and shipped in two large packages to Westinghouse Electric Corporation's Bettis Loop at National Reactor Testing Station, Idaho Falls, Idaho.

Large stainless-steel tank at left is deaerated-water storage tank. Tall, thin column above it is vacuum deaerator. Vacum pump is at extreme left. Tall slender column in foreground is mixed-bed ion exchanger.

Tanks and piping are designed for a working pressure of 200 psi. Right-hand unit includes electrical controls and chemical feeders.

(Water-treatment system is development of Illinois Water Treatment Co., 840 Cedar St., Rockford, Ill.)

Check 1303 opp. last page.

Solvent-vapor recovery in small quantities with packaged unit

Small, packaged solvent-recovery unit is used in salvaging solvent vapors in industrial plants using small quantities of solvents.

It can be used with any process in which water-immiscible solvent is lost by vaporization. Unit shows attractive return even when solvent costs are $1000/year.

(Packaged solvent-recovery unit is product of Vic Manufacturing. Company, 1313 Hawthorne Ave., Minneapolis, Minnesota.)

Check 1304 opposite last page.

Quality control with a master touch

Our quality control experts keep their eagle eyes on your fabricating work all along the way. They check materials and designs... all working, welding and testing operations. Come in and get acquainted with their exacting methods. Or write for Bulletins HE and CI.

A **The personal touch**—Our experienced, code-qualified welders are personally proud of the work they do. Each signs his welds with his own special code signature.

B **Come again**—Welded shells come back to the rolls for re-rolling that assures full roundness... smooth line-up with adjacent shell, head or tray.

C **Extra protection**—pressure-sensitive plastic film seals nozzle openings during shipment... keeps out dust, dirt, moisture. Hardboard cover prevents punctures.

D **Inside information**—The Magnaflux test... another way to inspect a welded seam... is frequently used to check critical pressure vessel welds at Downingtown.

Downingtown Iron Works, Inc.

144 Wallace Ave., Downingtown, Pennsylvania

division of **PRESSED STEEL TANK COMPANY** Milwaukee

Branch offices in principal cities

HEAT EXCHANGERS—STEEL AND ALLOY PLATE FABRICATION
CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

DOWNINGTOWN IRON WORKS Hackney

Check 1305 opposite last page

Sperry Filter Presses can be made with new glass-reinforced Polyester plates and frames.

A filtration problem that's unique to you . . . is probably "old hat" to Sperry.

Through 90 years of filtration leadership, Sperry has solved thousands of filtration problems for hundreds of industries—continually applying new ideas—new techniques—and new engineering know-how to produce *flexible, superior filtration at low cost!*

Sperry makes this priceless experience available to all industries —everywhere! To introduce it to your plant, simply write for a copy of Sperry's comprehensive filtration catalog. It's yours, without cost or obligation.

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FILTER PRESSES · FILTER MEDIA · CLOSING DEVICES · PLATE SHIFTERS

FREE SPERRY CATALOG

The outstanding performance of low-cost Sperry Filtration merits your further investigation. Write today for your free copy of the complete Sperry Catalog, including detailed information of Sperry's Plate-Shifters, Closing Devices and other Labor-Saving Accessories.

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CP-4

Name_____

Company_____

Address_____

City_____ State_____

Check 1306 opposite last page

Vibrating screen's motor is self-contained

No need for belts, chains, separate motor mountings

Uses: Dry or wet screening of bulk materials ranging from 100 mesh to three-inch lumps.

Features: Self-contained electric motor on screen eliminates need for belts, chains, and separate motor mountings. Easily replaceable screening surfaces are available in variety of types and mesh sizes.

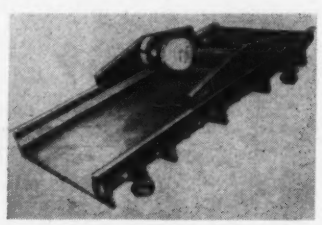
Description: Electromechanical vibrating screen is driven by self-contained, unbalanced electric motor with thermal-overload switch.

Motors are totally enclosed, pressure-tight, and waterproof, with sealed-in, forced-air, oil-mist lubrication. Motors operate from 220- or 440-v, three-phase, 60-cy AC.

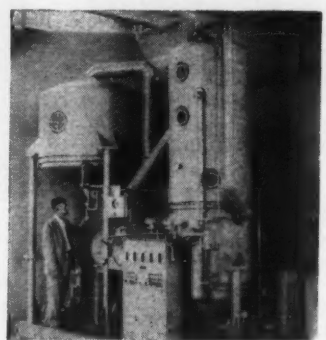
Four- by six-foot or five- by ten-foot models are available. Both can be furnished as single- or double-deck screens with either 900- or 1800-rpm drives.

(Vibrating screens are product of Syntron Company, Homer City, Pa.)

Check 1307 opposite last page.



Motor on vibrating screen is equipped with thermal-overload starting switch



"Hot" liquid wastes . . .

can be concentrated at rate of 200 gph in this thermo-compression-type evaporator. Constructed of inconel and stainless steel, unit occupies 6 x 11½ ft floor area, stands 13½ ft high, and weighs about 12,500 lb. Evaporator cost $40,000 and is now operating in an atomic plant.

(Evaporator was manufactured by Mechanical Equipment Company, Inc., 861 Carondelet Cor. St. Joseph Sts., New Orleans 12, La.)

Check 1308 opp. last page.

"If you can hear me, Miss Morgan, bring me something to gargle."

PROBLEMS?

Interested in solving them? Want to learn new ways of improving your plant operation and, thereby, realize savings?

In each . . .

issue of CHEMICAL PROCESSING there are articles that will help you solve many of your operational problems.

These "New Solution" stories appear in the "New Solutions" section which begins on page 31 of this issue.

This type of story is featured in other sections throughout the magazine.

They are case history stories that state the operating problem, explain how it was solved, and describe the results obtained. "New Solution" stories cover all important phases of your operations — processing, safety, maintenance, material handling, packaging, corrosion, to name a few.

For more information on product at right, specify 1309 see information request blank opposite last page.

Service for PETRO-CHEMICALS **from . . . ALLIS-CHALMERS**

A local call

brings service to any branch plant

Your branch plants — no matter where they are located — are only a phone call away from Allis-Chalmers service.

To provide this guarantee of prompt service on mechanical and electrical equipment, A-C offers its petro-chemical customers a whole mapful of personnel and facilities. They include:

- **12 Regional Offices** — to serve as coordination centers from coast to coast.
- **79 Local Offices** — covering every industrial area in the country.
- **Field and Erection Personnel** — located strategically for 'round-the-clock' duty.
- **Certified Service Shops** — a vast network to provide minutes-away service.
- **Warehouse Stocks** — there's no waiting anywhere for replacement parts and components.

Matching this service is a tremendous scope of industry-designed equipment from one source. Ask your A-C representative about the last word in product designs, all proven by research and application, all built for outstanding quality control. Or write Allis-Chalmers, Milwaukee 1, Wisconsin.

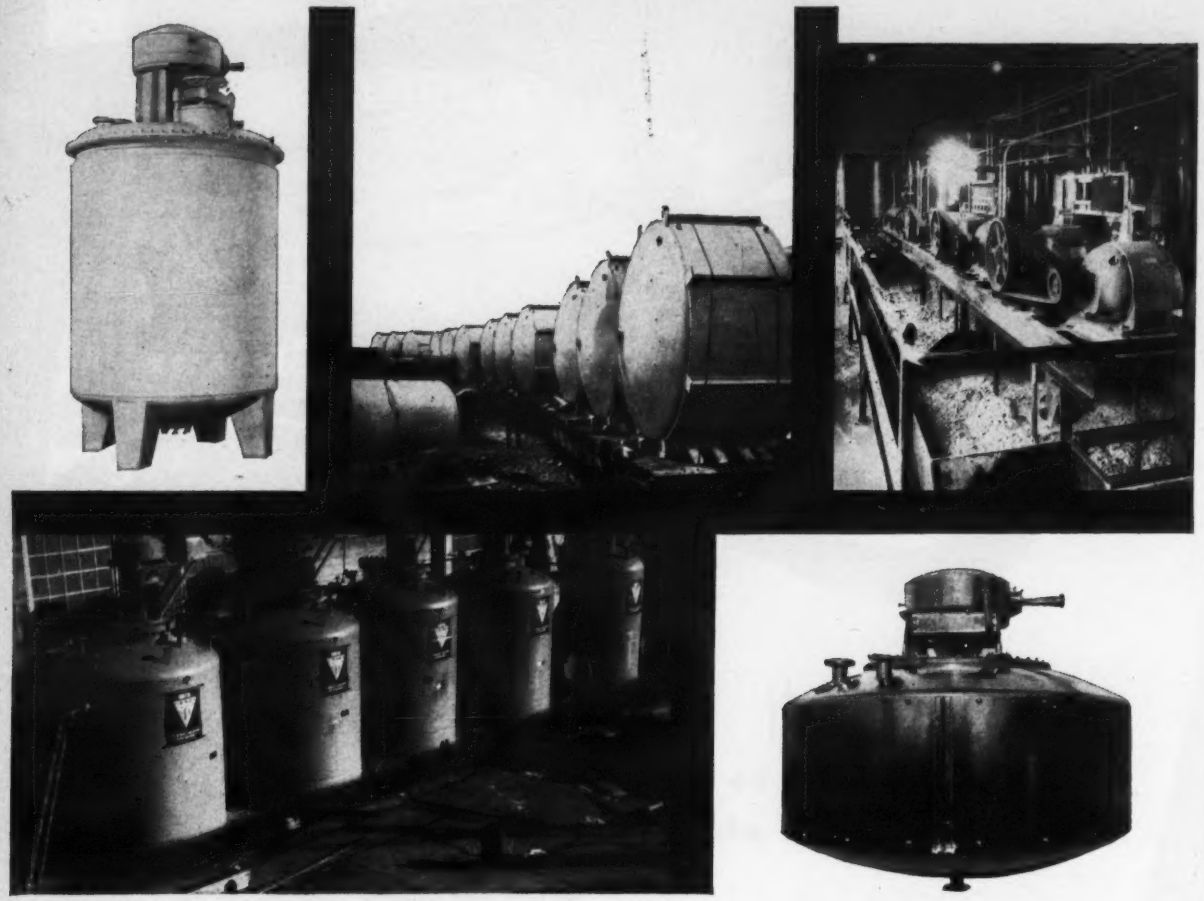
Products for Petro-Chemicals: Electrical Generation, Distribution and Utilization Equipment; Pumps, Motors and Control; *Texrope* Drive Equipment; Processing Machinery (mills, kilns, screens, etc.); Water Conditioning Systems, plus Materials Handling Equipment.

Texrope is an Allis-Chalmers trademark.

A-C ALLIS-CHALMERS

A 5915

one source...one responsibility...



when General American supplies the mixer package

No middleman need enter the picture when you look to General American for your mixing requirements.

General American's Turbo-Mixer Division not only supplies you with the most effective and economical mixing equipment, but with tank and supporting structures, drive and special accessories.

This "one package responsibility" saves you money, assures perfect harmony of all components in your production line, and long, trouble-free performance.

Our engineers are ready to bring you their comprehensive experience in this field. Investigate. You'll find

IT PAYS TO PLAN WITH GENERAL AMERICAN

FOR DETAILED INFORMATION AND USEFUL DESIGN DATA, SEND FOR THE FOLLOWING BULLETINS:

Please send me the following Turbo-Mixer Bulletin (s) :

General Turbo-Mixer Bulletin_____

RDC Extraction Column Bulletin_____

Side Entering Propeller Mixer Bulletin_____

Absorption & Oxidation Bulletins_____

Process Equipment Division

TURBO-MIXERS

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street

Chicago 90, Illinois • Offices in principal cities

Check 1310 opposite last page

Air temperature, humidity automatically controlled by dehumidifier

Liquid-absorbent spray used to remove air moisture

Uses: Direct removal of moisture from atmospheric air.

Features: Moisture-sensitive instruments are not required. Automatic control of temperature and relative humidity of conditioned air is secured by thermostat.

Description: Dehumidifying unit removes moisture from air by means of liquid absorbent sprayed in air stream.

Temperature of spray determines dry-bulb temperature of air leaving conditioning unit. Concentration of absorbent liquid controls dewpoint temperature of air.

Necessary concentration of absorbency is obtained by continuously cycling diverted absorbent through concentrating unit. Unit removes water from system at same rate it is taken up by concentrator.

(Dehumidifiers are products of Niagara Blower Company, 405 Lexington Ave., New York 17, N. Y.)

Check 1311 opposite last page.

Chillers maintain positive temperature control to within ±3°

Uses: Cooling manufacturing and processing equipment or chilling and controlling temperatures of chemicals and other liquids.

Features: Maintains temperature control of any liquid to within ±3°.

Description: Chillers are equipped with large, oversized condensers for effective dissipation to keep unit operating at maximum capacity. They're available in five sizes up to 10 hp.

Easily accessible compressor is equipped with magnetic starter. Air- and water-cooled types are furnished with self-contained recirculating water-pump assembly.

To page 158

THAT'S INTERESTING

Sailing, sailing

Plastic system using phenolic spheres is being adopted as a top-side sandwich-core material by Eastern shipbuilding firm. Technique reportedly adds lightweight strength to deck sections. *(News About Bakelite Plastics).*

Runaways

There's a good chance that some time a good portion of earth's population might live elsewhere in the universe, says Dr. A. R. Kantrowitz, director of AVCO Research Laboratories. He pointed out that "migrations have always been a result of people running away from something, not towards something and you don't have to look far today to see the pitchfork." He referred to the potential power of nuclear energy which he said "needs the vastness of interplanetary space" to make a situation we can live with.

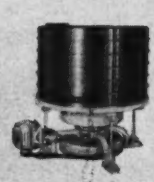
For more information on product at right, specify 1312 see information request blank opposite last page.

SCOPE in INDUSTRY
SPECIALIZATION from...

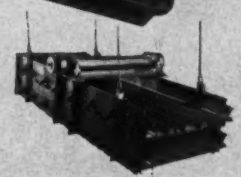
ALLIS-CHALMERS

Compacting Mill

Roller-type Granulating Mill



Gyratory Screen



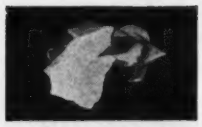
Vibrating Screen

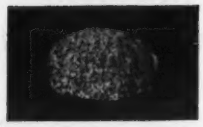
Allis-Chalmers compacting process

Rescues "Lost" Profits

...converts waste chemical fines into a salable product

Plan to stay ahead... MODERNIZE!





A potash producer salvages seven tons per hour from sub-sized fines. A chemical salt manufacturer effects an 80% recovery of marketable material. Yes, waste becomes valuable when put through the Allis-Chalmers compacting process.

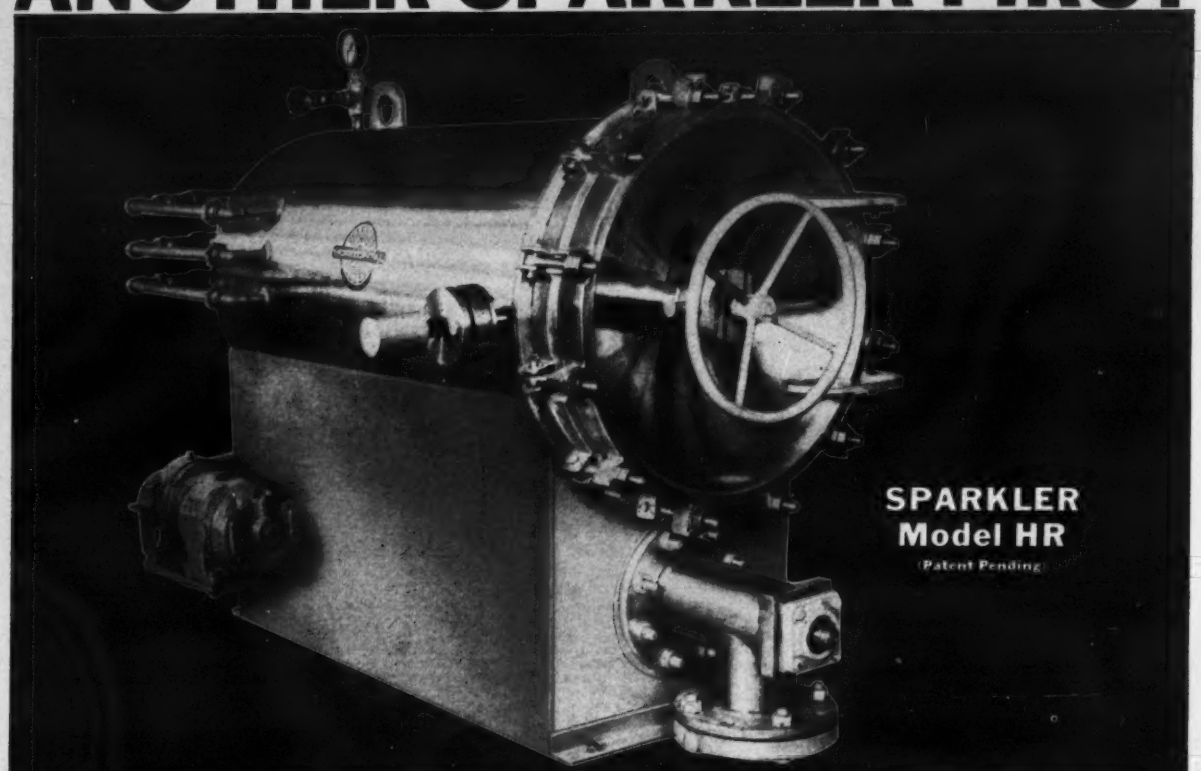
The compacting system is a package of integrated Allis-Chalmers equipment — the remarkable new compacting mill, a roller mill and either a gyratory or vibrating screen. The compacting mill mechanically densifies fines created in your original process. The resulting flakes or slabs are granulated in the roller mill and separated in the screen. Precise control of particle size, density and solubility factors is assured. Recovered product equals or surpasses parent product in every respect.

Get Bulletin 07B8836 from your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers Ltd., Box 37, Montreal, Quebec.

A-C ALLIS-CHALMERS

A-5947

ANOTHER SPARKLER FIRST



A REVOLUTIONARY NEW FILTER

NOW–HORIZONTAL PLATE CAKE STABILITY PLUS DRY CAKE DISCHARGE. –ALL AUTOMATIC–

This filter has all the operating features filtration engineers have dreamed of for years—Write for details.

SPARKLER FILTERS

SPARKLER MANUFACTURING CO.
MUNDELEIN, ILLINOIS U. S. A.

Sparkler International Ltd., Manufacturing Plants at Leliegracht 9, Amsterdam, Holland; Toronto, Ontario, Canada; Italy and Australia.

FILTRATION ENGINEERING AND MANUFACTURING EXCLUSIVELY FOR OVER 30 YEARS

Check 1313 opposite last page

From page 156

Unit also includes adjustable thermostat for temperature control, oversized receiver and evaporator, high-capacity dryer, high- and low-pressure controls.

Temperature control of any liquid to within ±3° is possible with liquid chiller

Chillers are delivered completely wired, packaged, and charged with Freon. Units may be modified to meet special requirements. Average space requirements are only 15 sq ft.

(Liquid chillers are product of Industrial Products Division, Vic Manufacturing Company, 1313 Hawthorne Ave., Minneapolis 3, Minn.)

Check 1314 opposite last page.

Pilot plant equipment for chemical processing field is subject of loose-leaf type catalog. Complete line of columns, condensers, heat exchangers, pressure vessels, reactors, and other equipment are illustrated. Numerous engineering drawings are included. "Pilot Plant Equipment"—Doyle & Roth Mfg. Co., Inc., 136-50 Twenty-fourth Street, Brooklyn 32, New York.

Check 1315 opposite last page.

Oil-treated collection plate not needed in air filter

Uses: In plants requiring dirt-free and grime-free atmospheres.

Features: Oil-treated collection plate is not used to retain dust in filter unit. This eliminates oil vaporization that can condense and settle on sensitive equipment and materials.

Description: Filter has 1000-cfm capacity. It is avail-

To page 160

WHAT DO YOU THINK?

Opinions and comments on the significant subjects carried in each month's CHEMICAL PROCESSING are important! We *welcome* your letters expressing your views. Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in CHEMICAL PROCESSING, others will have the opportunity to hear your side.

Perhaps you agree

with what has been written in these articles.

Maybe you don't.

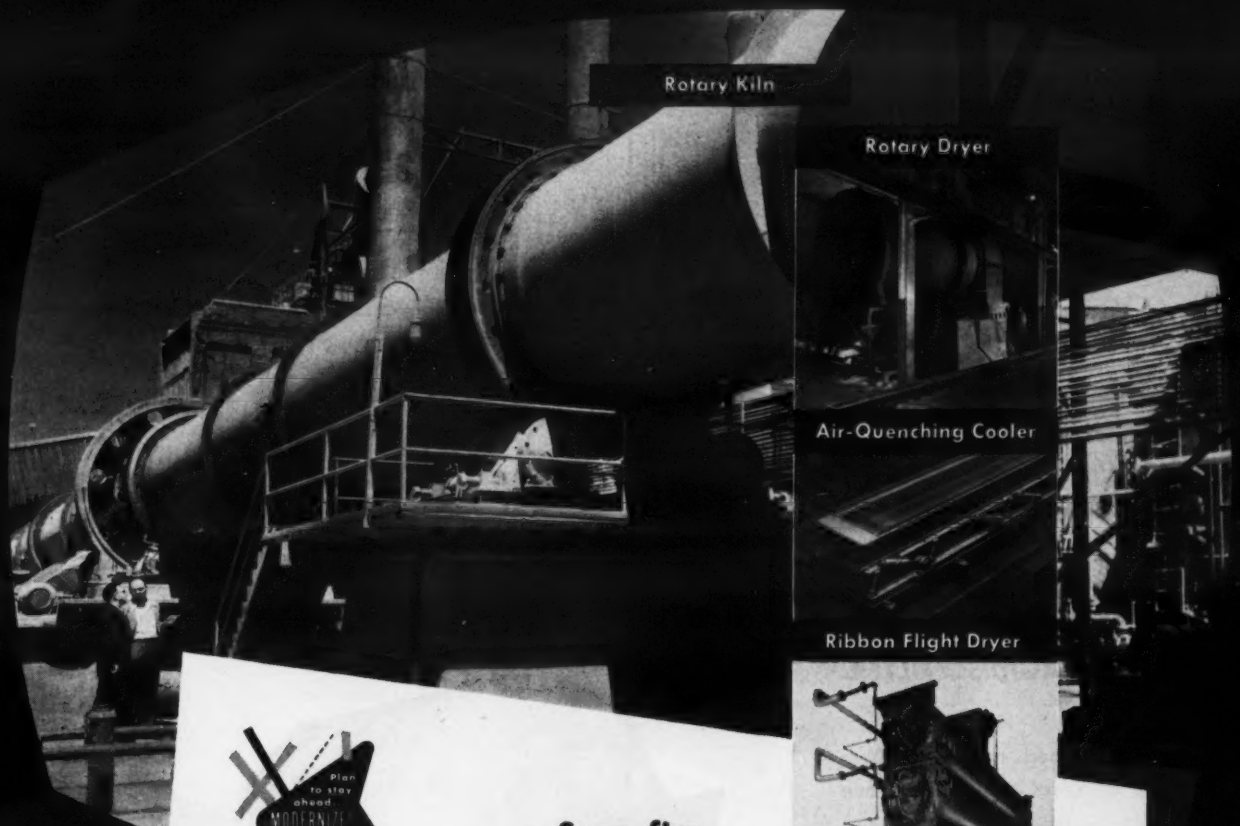
You might even have a thought or angle which wasn't expressed.

If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See page 13.)

Address your comments to:
The Editor
CHEMICAL PROCESSING
111 E. Delaware Place, Chicago 11, Illinois

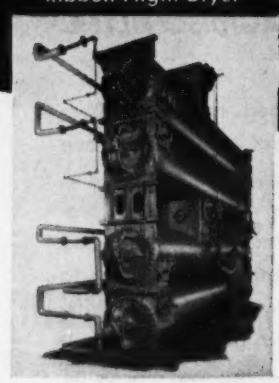
For more information on product at right, specify 1316 see information request blank opposite last page.

SCOPE in INDUSTRY SPECIALIZATION from... **ALLIS-CHALMERS**



Plan to stay ahead... MODERNIZE

Sure-fire heat-transfer efficiency



...comes in a package

A HARD-WORKING kiln—particularly an Allis-Chalmers kiln—has a burning desire to cut costs, increase chemical production and improve quality. But that kiln's fired-up ambition just smolders *unless* it is associated with equally efficient equipment in a well-designed flow.

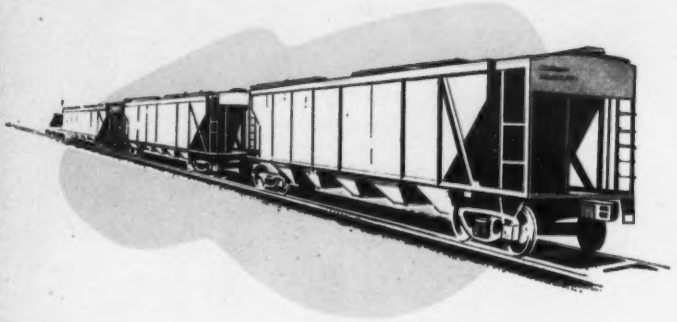
As the world's leading producer of rotary kilns, dryers and coolers, Allis-Chalmers is concerned with the entire heat-transfer operation . . . the evaluation of variables . . . the integration of interdependent equipment, old and new, into a profitable process. Flow design, prerecommendation research and testing, and installation advice are all part of the Allis-Chalmers package.

Ask your A-C man for Bulletin 25C6177, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers Ltd., Box 37, Montreal, Quebec.

A-C ALLIS-CHALMERS

A-5954

An Easy Way to Lower Freight Costs



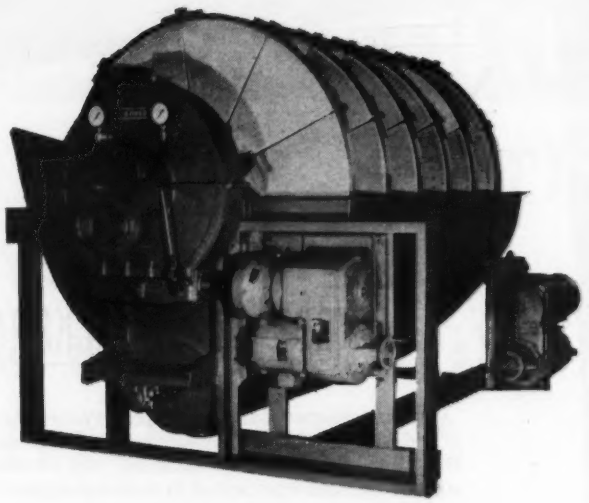
ON YOUR CONCENTRATES

Ship less liquid . . . more concentrate . . . per freight dollar! Say you ship 50 tons of concentrate with a moisture content of 17%, but by a change in your mill you could cut the moisture content to 7%. That would mean 5 tons more concentrate shipped for the same freight cost!

USE THE EIMCO AGIDISC FILTER

It has helped more operators (names of users on request) save money in shipping concentrates than any other single piece of processing equiment, by reducing moisture content of concentrates to the lowest (by competitive tests) percent of any given material. It does it faster, at less cost and better than any other method.

Want Proof? Get all the details by writing The Eimco Corporation, P. O. Box 300, Salt Lake City 10, Utah.



THE EIMCO CORPORATION • SALT LAKE CITY, UTAH

Research and Development Division, Palatine, Illinois • Process Engineers, Inc. Division, San Mateo, California

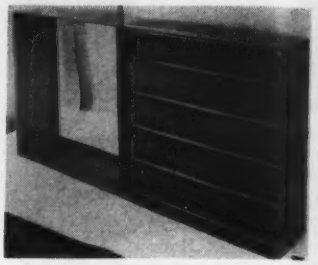
Export Offices Eimco Building, 51 - 52 South Street, New York 5, N. Y.

BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

B - 383

Check 1317 opposite last page.

From page 158

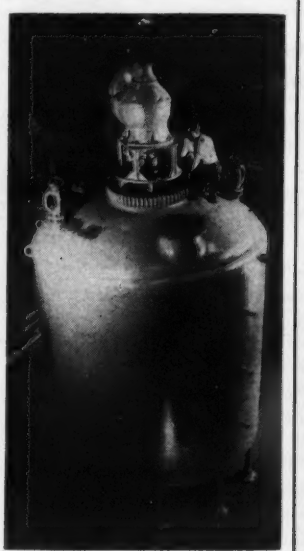


Air filter does not incorporate oil-treated collection plate. Thus, oil condensation is no problem

able in 24 x 24 x 6″ size. Conditions of varying humidity do not cause bulk release of dust.

(Dustfoe space filter is product of Mine Safety Appliances Company, 230 N. Braddock Ave., Pittsburgh 8, Pa.)

Check 1318 opposite last page.



Glassed-steel reactor

. . . of 7150-gal capacity is said to be largest ever fabricated for use in highly corrosive environment. Vessel is 120″ in outer diameter and 166″ in height.

(Glassed-steel reactor is product of The Pfaudler Company, Division of Pfaudler Permutit Inc., Rochester 3, N. Y.)

Check 1319 opp. last page.

THAT'S INTERESTING

Shoes that breathe

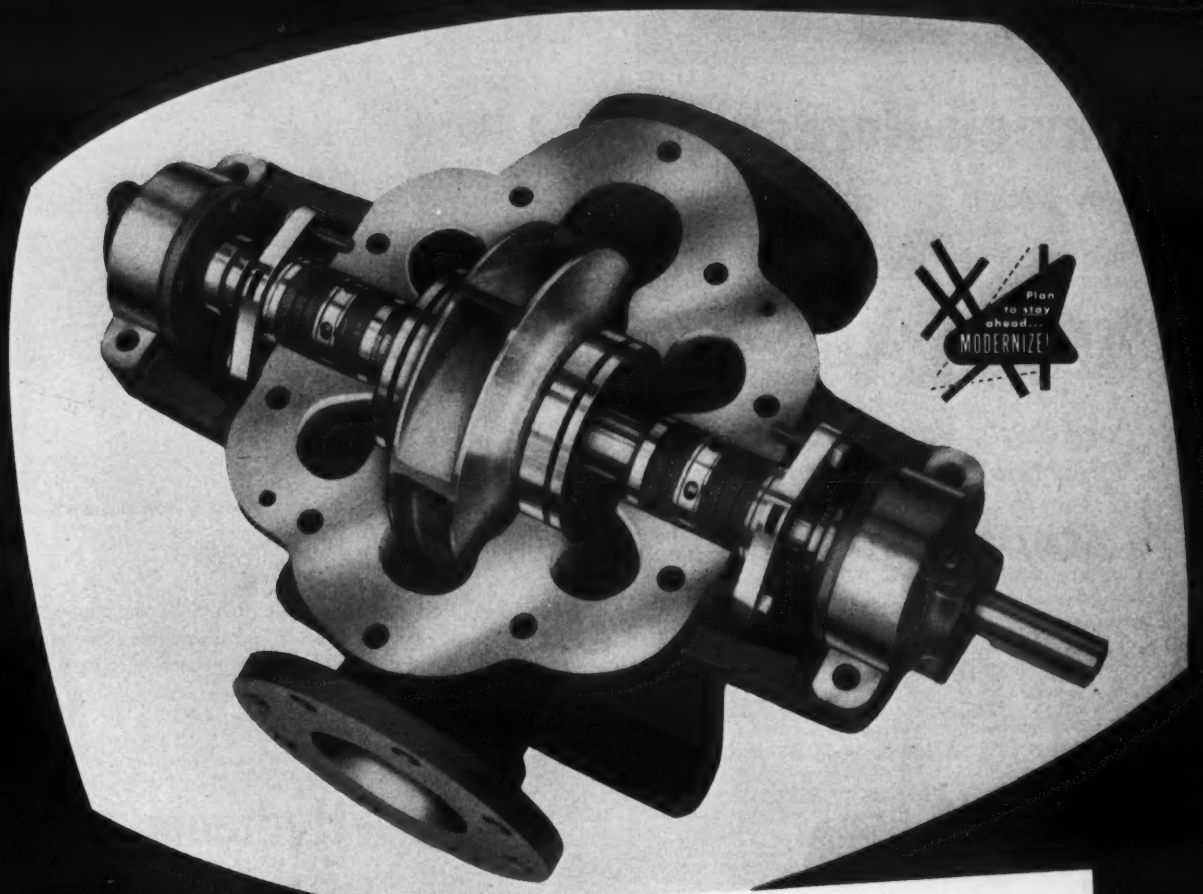
By molding soles to silicone-treated upper leather, shoes are made completely waterproof. Seam between upper and lower sole is eliminated. Vulcanizing process developed in England by C. & J. Clark, Ltd., is said to make the "breathable" water-proof shoe a practical reality.

Rocket weatherman

Low-cost meteorological rocket has risen to 174,000′ in test firing. It is only 7′ long, 4½″ in diameter, and can be launched by two men. Launcher resembles mortar tube, 11″ long. Weighs only 71 lb complete with load of slow-burning solid propellant. Called ARCAS, it may be forerunner of plastic rockets that weathermen will fire daily to obtain more accurate forecasts.

For more information on product at right, specify 1320 see information request blank opposite last page.

SCOPE in PUMP DESIGN from... **ALLIS-CHALMERS**



Here's extra dependability

for pumping most any flowing liquid

Bronze, nodular iron, stainless steel, high nickel alloys — in fact, all metals that can be cast and machined — are available in Allis-Chalmers single-stage, double-suction pumps.

This material availability makes A-C pumps exactly *right* for *your* problems of temperature, corrosion and contamination . . . makes them extra-reliable for pumping most liquids that flow.

Adding to this reliability is the optional feature of adjustable axial-clearance wearing rings. They keep pump efficiency high . . . have saved as much as 75% maintenance and replacement costs. Too, axial clearances prevent jamming. Another optional feature — mechanical seals — can be furnished.

These pumps are offered in a wide variety of sizes from 1½″ to 72″ with capacities to 225,000 gpm, heads to 600 feet. Contact your A-C office, or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

A-C ALLIS-CHALMERS

A-5854-C

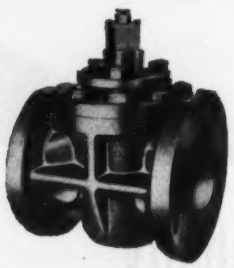
NEW!

Rockwell-Nordstrom

COATED VALVES

For Longer Valve Life, Lower Cost On Corrosive Services

New coatings applied to Rockwell-Nordstrom iron and steel lubricated plug valves assure the performance of more costly metals usually needed on highly corrosive services. *Kanigen*[1] coatings effectively resist corrosion on services where nickel or expensive alloys are usually required. *K-51: "Penton"*[2] coatings stop corrosion by acids, caustics, brines and most organic solvents.



SEND FOR FREE LITERATURE . . . *get complete facts on how you can have better valve service at lower cost.*

Write for complete details on the world's most complete line of lubricated plug valves, plug valve lubricants and accessories: Rockwell Manufacturing Company, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited.

(1) Applied by General American Transportation Corporation.

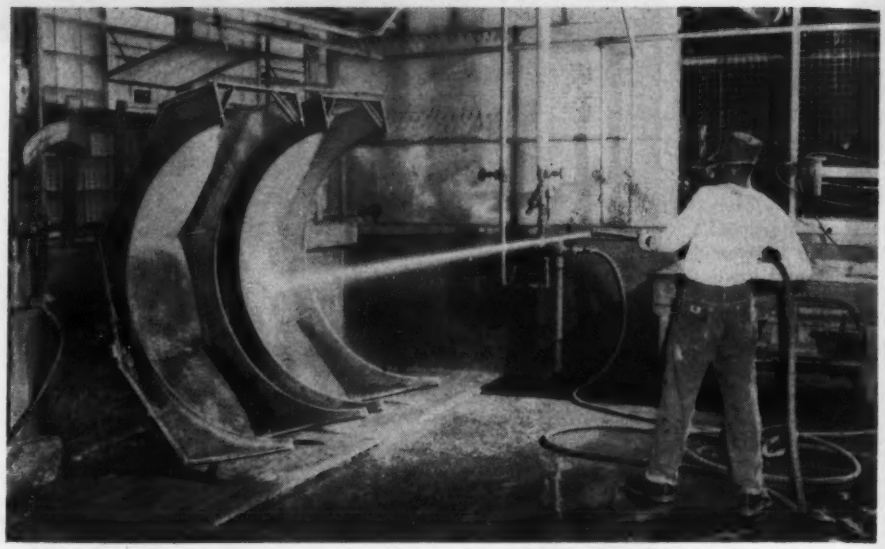
(2) (3) K-51 Penton and Whirlclad are patented by National Polymer, Inc.

ROCKWELL-Nordstrom VALVES

another fine product by

ROCKWELL

Check 1321 opposite last page



Processing the more than 6000 colors of American Cyanamid's Beetle and Cymel plastics requires careful attention to cleanliness of equipment. Manpower efficiency is up and chance of contamination down as . . .

Hydraulic jet supplies better ball mill cleaning

Blasting through crevices and tiny openings in screens and grills, jet stream cleans without disassembly for manual brushing or scraping

PROBLEM: Hand cleaning of ball mills, using wire brushes and a hot water hose, was time consuming, costly, and not always completely satisfactory at American Cyanamid's Bound Brook, N.J. plant. To prevent color carryover in mills used to powder Beetle and Cymel thermosetting plastics, all traces of residual material had to be removed from ball mill grills, screens, and housing, as well as cutter screens.

Even a small speck could not be tolerated. Any carryover of material into a later batch might show up conspicuously on surface of a finished molded piece. More than 6000 special colors are produced.

Red, dark blue, and other staining colors were particularly hard to remove. Often, smaller screen openings were cleaned practically hole-by-hole with a piece of wire or other small tool.

About an hour of laborer's time was needed to clean a single mill. Additional

Powerful jet stream removes all traces of even most staining colors from ball mill housings. Contamination of successive batches is prevented

expense was incurred because a mechanic had to be called in to disassemble the grill before cleaning could begin.

Solution: After studying various methods of cleaning, department engineers decided on a system utilizing a high-pressure hydraulic jet. Jet cleaner mixes steam, at pressures up to 125 psi, with cold water in a venturi mixing chamber to produce a powerful jet stream of hot water. Jet stream velocity is two miles per minute. Impact of this solid stream provides hydraulic scrubbing action.

Operation of unit is simple. Operator merely turns on water and opens steam valve until desired pressure is obtained.

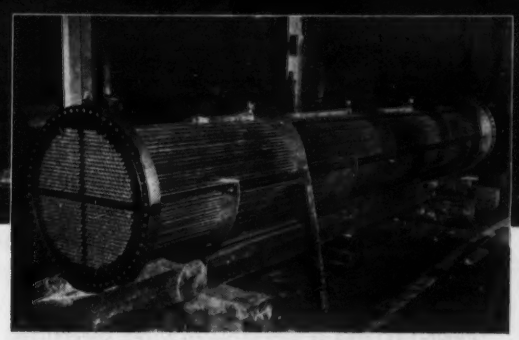
Results: Cleaner's powerful stream blasts particles of powdered plastic out of even tiniest corners of screens and housings. All of even most staining colors are completely removed to eliminate possibility of contaminating successive batches.

In addition, downtime and skilled labor charges are reduced by eliminating disassembly for manual brushing or scraping. A tough, dirty job is made easier.

(Hydraulic jet cleaner is a product of Sellers Injector Corp., 1636 Hamilton St., Philadelphia 30, Pa.)

Check 1322 opposite last page.

Plastics standards, a compilation of 191 ASTM specifications, are contained in 1108-page, paper-cover book. It has 43 standards not appearing in previous 1957 edition including tentative abbreviations of terms relating to plastics. To obtain "Compilation of ASTM Standards Relating to Plastics" remit $8.00 directly to ASTM Headquarters, 1916 Race St., Philadelphia 3, Pa.



REVERE 70/30 and 80/20 CUPRO-NICKEL tubes were used in high and low pressure feed water heaters designed and fabricated by CONDENSER SERVICE & ENGINEERING CORP., Hoboken, N. J., for Kent Avenue Station of the New York City Transit Authority.

. . . tube with REVERE

Since no single alloy will be most reliable and economical under all various conditions encountered, the wealth of knowledge accumulated through Revere's Research Department is of vital importance to you.

For, over the years these specialists have compiled extensive data regarding the relative corrosion resistance of the different alloys under a wide variety of operating conditions. Why not take advantage of this storehouse of facts and consult with Revere's Technical Advisory Service before selecting the tubes for your equipment?

Revere also furnishes plates, from the smallest to the largest sizes, in Cupro-Nickel, Copper, Herculoy, Muntz Metal, Naval Brass and Admiralty, and tubes in Cupro-Nickel, Aluminum Brass, Admiralty, Herculoy, Arsenical Copper, Muntz Metal and other alloys.

REVERE COPPER AND BRASS INCORPORATED

COPPER * BRASS 18 01 REVERE ALUMINUM

Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N. Y.

Mills: Rome, N. Y.; Baltimore, Md.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Brooklyn, N. Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities, Distributors Everywhere.

Check 1323 opposite last page

Save time! Save money!

Repair **corroded concrete with**

Penntrowel

Surfacing Compounds

Badly corroded concrete and cement surfaces in your plant don't *have* to cost you long shut-downs and expensive contracting jobs. You can *repair* those damaged areas with new PENNTROWEL Surfacing Compounds.

PENNTROWEL is tough. Its impermeable, corrosion-resistant coating turns away acids, alkalis, solvents . . . gives long service . . . doesn't crack or slough off.

PENNTROWEL is easy to use. You mix it right at jobsite, then just trowel it on . . . need no expensive equipment to mix and apply.

PENNTROWEL cures fast. Apply in afternoon, use surface next day!

PENNTROWEL is economical. Materials and surface preparation costs are amazingly low. And PENNTROWEL reduces future maintenance costs.

PENNTROWEL is available in three specialized grades . . . for corrosion protection, fluorine service and heavy wear. Write for descriptive folder and installation cost data.

Ask for a Demonstration **We'll be glad to demonstrate PENNTROWEL's remarkable abilities to you right in your plant. Call or write today to arrange a test.**

Pennsalt Chemicals
ESTABLISHED 1850

Corrosion Engineering Products Dept. 681
PENNSALT CHEMICALS CORPORATION
Natrona, Pa.
Penntrowel is a trade-mark of Pennsalt Chemicals Corp.

Check 1324 opposite last page

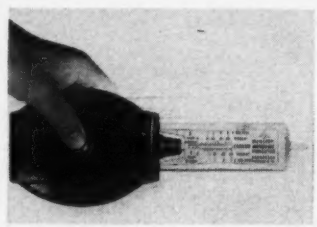
Direct-reading indicator measures percentage of carbon monoxide

Has no electrical circuit; color comparison eliminated

Uses: For detection and direct percentage measurement of carbon monoxide.

Features: Mechanically operated instrument has no electrical circuit and therefore may be used in presence of flammable gases. Because it indicates percentage CO by measurement of length of stain developed in indicating tube, color comparison is eliminated and visual color response of operator cannot affect results.

Description: Carbon monoxide test using pocket-size indicator is made by depressing then releasing push button of instrument's precision-built sampling pump, thus drawing



Pocket-size indicator safeguards life and health wherever carbon monoxide hazard may exist

controlled sample volume through replaceable glass indicating tube. Sealed ends of tube are broken open just prior to use. Tube contains a yellow-colored CO-sensitive palladium compound impregnated in highly purified silica gel together with a guard gel for removing smoke, fumes, and gases other than carbon monoxide.

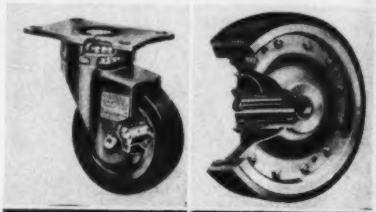
Presence of carbon monoxide in sample tested is shown by development of brownish-gray stain on indicating tube's yellow-colored gel. Percent concentration of CO is established by measuring length of stain with sliding calibrated scale.

(Monoxor is product of Bacharach Industrial Instrument Co., 200 North Braddock Ave., Pittsburgh 8, Pa.)

Check 1325 opposite last page.

Designed for

THE CHEMICAL PROCESSING INDUSTRIES



DARNELL
CASTERS AND WHEELS

All types of rubber treads—soft, medium and hard—for smooth operation on all kinds of floors. Featuring Neoprene rubber treads - resistant to oxidation, oils and waxes as well as being unaffected by most chemicals - expertly compounded to Darnell standards.

All casters, whether steel or rubber tread, available in swivel and stationary models with various top plates, stems and fittings for any type application.

*

FREE! and Packed with useful DATA...

Darnell Distributors are listed in the Yellow Pages under Casters and Wheels

DARNELL CORPORATION, LTD.
DOWNEY, LOS ANGELES COUNTY, CALIFORNIA
37-28 SIXTY-FIRST ST., WOODSIDE 77, L. I., N. Y.
36 NORTH CLINTON STREET, CHICAGO 6, ILLINOIS

Check 1326 opposite last page

Explosion-proof thermostat

. . . is aproved for Class I, Group D hazardous areas. Thermostat is designed for convenient immersion in tanks, wall installation, and exposure to contaminated environments.

Unit is made up of three sub-assemblies: switch unit, stainless-steel well, and explosion-proof junction box.

Thermostat is completely adjustable in 32 to 500°F temperature range. It can be exposed indefinitely to −100°F and for short periods to 100°F above its set point. Unit operates on 10-amp, 115-v or 5-amp, 230-v AC.

(Explosion-proof thermostat is product of Fenwal Incorporated, Pleasant St., Ashland, Mass.)

Check 1327 opposite last page.

Complete protection for starting switch of electric motor

Single-phase electric motor features complete seal protection for the starting switch — cause of over 34% of all single-phase motor failures. This design concept is the result of five years of continuing laboratory and field testing with over 20 million starts to prove worth of design.

The switch, capacitor, thermostat, actuator, and terminal board, have been totally encased in this motor. This prevents dirt, dust, insects, rodents, and other foreign material accumulations which, previously, have faulted the switch mechanism causing motor failure.

General-purpose, single-phase motors — 1/3 through 1½ hp are available in NEMA rating 56 fram with rigid base. Blower motors in 56 frame, rigid or resilient base, are available in sizes from 1/3 through 2 hp. All motors are totally encased with completely sealed starting switches.

(Electric motors are product of Electric Motor Div., A. O. Smith Corp., Tipp City, Ohio.)

Check 1328 opposite last page.

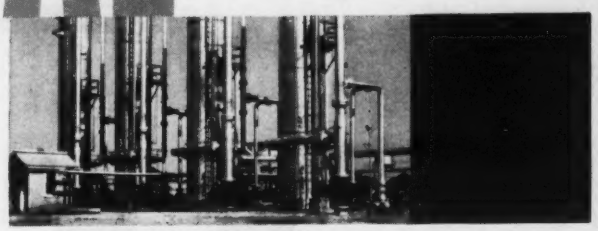
POTENTIAL

1. FABRICATION of all types of equipment (Fractionating Columns, Gas Columns, Pressure Vessels, Plate and Heavy Steel Work, Special Machines, Autoclaves, Shells, Bridge Girders) is performed to order, to specification.

2. MACHINING—Fully equipped, flexible facilities for machining to close tolerances, regardless of product size or design.

3. STAINLESS—Separate, integrated shop for stainless fabrication protects against contamination by ordinary steel.

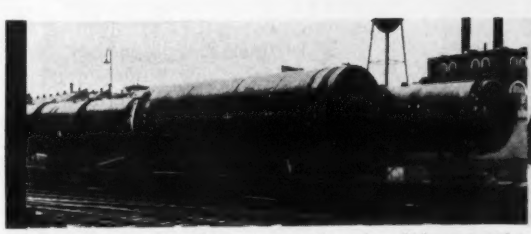
4. DELIVERY by rail, truck or inland, coastal or overseas waterway.



FABRICATION

2 MACHINING

3 STAINLESS



4 DELIVERY

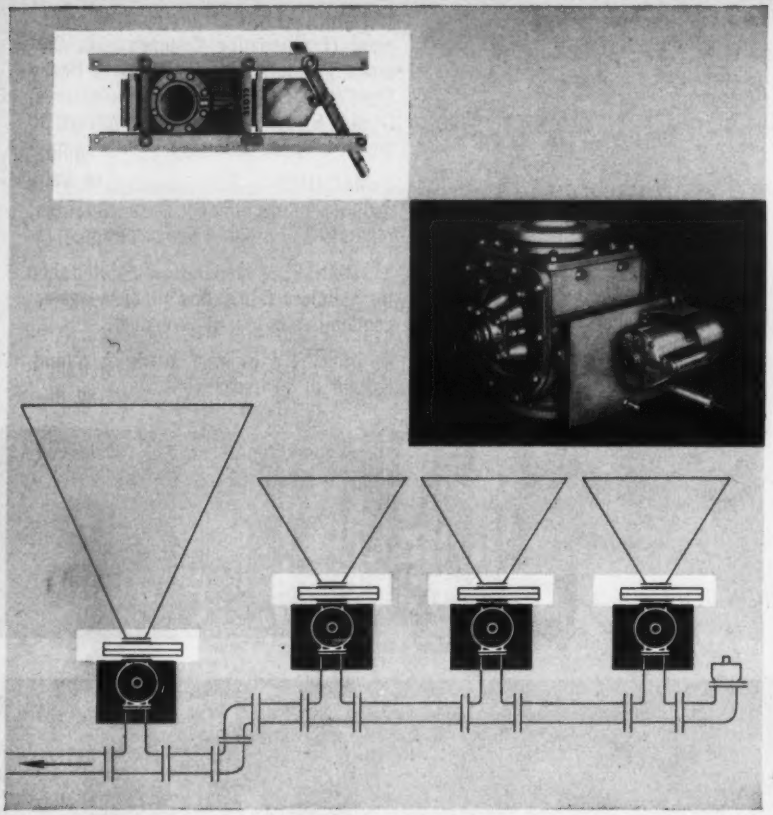
Through integrated, efficient operation, Sun Ship can reduce costs, increase your POTENTIAL. Call for an estimator or representative.

Sun

SHIPBUILDING & DRY DOCK COMPANY

ON THE DELAWARE • SINCE 1916 • CHESTER, PA.

Check 1329 opposite last page



BLEND AND TRANSPORT PNEUMATICALLY

Here's another practical solution to a chemical materials blending and handling problem. Here, several dry, granular solids are proportioned and blended in transit—a cost cutting combination of operations made possible by A-S-H Rotary Feeders and Universal Slide Valves.

This was our solution to the problem of a prominent manufacturer. If you face a similar problem you'll find it worthwhile to talk it over with your local A-S-H Sales Engineer. At your request we'll send his name and address and the Data Sheets describing these components in detail.

***THE ROTARY FEEDER LEASE-PURCHASE PLAN**—For pilot unit or plant-test operations, where the scope of the test may not justify the full purchase of a Rotary Feeder, we offer a Lease-Purchase Plan. Ask our Representative for details.*

the **Allen-Sherman-Hoff** company

257 E. Lancaster Ave., Wynnewood, Pa.

Offices and representatives in principal cities

MATERIALS HANDLING EQUIPMENT

Check 1330 opposite last page

Electric motor operates over extended periods in temp of 1000°F

Scientists have developed an electric motor that is believed to be the first to have operated in the 1000°F range for any appreciable length of time without some form of artificial cooling. The motor has run for more than 100 hours while sealed inside an oven at 950°F.

Motor was designed to test, in as severe a practical application as possible, the performance of a system of electrical insulation for motors, transformers, relays, and other electrical equipment required to operate at very high temperatures. The insulation (glass fiber-mica-phosphate combination) is composed entirely of inorganic materials, including inorganic binders to bond the insulation permanently to the wire it protects. No plastics, cloth, or other organic substances are used.

While surrounded by searing heat experimental electric motor performs efficiently enough to do useful work

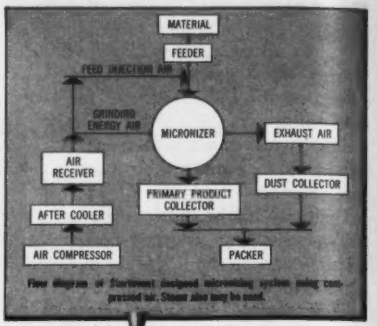
The inorganic insulation has been prepared experimentally in a number of forms suitable for wide variety of uses. These include: insulated wire, flexible sheet insulation, and laminated materials. The thermal life of all insulated materials up to temperatures of 950°F is considered almost indefinite.

(Insulation system and motor are development of Westinghouse Electric Corporation, Box 2278, Pittsburgh, Pa.)

Check 1331 opposite last page.

Need ½ to 44 Microns?

Sturtevant Micronizers* Make 325 Mesh Obsolete



Flow diagram of Sturtevant designed micronizing system using compressed air. Steam also may be used.

One Operation Reduces, Classifies

Sturtevant Micronizers grind and classify in one operation in a single chamber—provide fines in range from ½ to 44 microns to meet today's increased product fineness needs. Can handle heat-sensitive materials.

Production Model (15 in. chamber)

No Attritional Heat

Particles in high speed rotation, propelled by compressed air entering shallow chamber at angles to periphery, grind each other by violent impact. Design gives instant accessibility, easy cleaning. No moving parts.

Classifying is Simultaneous

Centrifugal force keeps oversize material in grinding zone, cyclone action in central section of chamber classifies and collects fines for bagging. Rate of feed and pressure control particle size.

Eight Models Available

Grinding chambers range from 2 in. diameter laboratory size (½ to 1 lb. per hr. capacity) to large 36 in. diameter production size (500 to 4000 lbs. per hr. capacity). For full description, request Bulletin No. 091.

Engineered for Special Needs

A 30 in. Sturtevant Micronizer is reducing titanium dioxide to under 1 micron at feed rate of 2250 lbs. per hr. For another firm, a 24 in. model grinds 50% DDT to 3.5 average microns at a solid feed rate of 1200-1400 lbs. per hr. A pharmaceutical house uses an 8 in. model to produce procaine-penicillin fines in the 5 to 20 micron range. Iron oxide pigment is being reduced by a 30 in. Micronizer to 2 to 3 average microns.

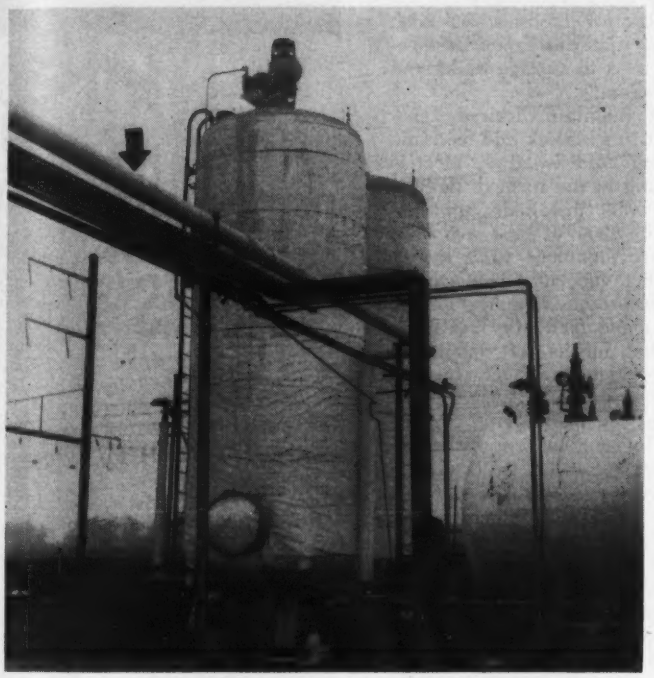
Sturtevant will help you plan a Fluid-Jet system for your ultra-fine grinding and classifying requirements. Write today.

Can Test or Contract Micronizing Help You?

Test micronizing of your own material, or production micronizing on contract basis, are part of Sturtevant service. See for yourself the improvement ultra-fine grinding can contribute to your product. Write for full details. STURTEVANT MILL CO., 119 Clayton St., Boston, Mass.

*REGISTERED TRADEMARK OF STURTEVANT MILL CO.

Check 1332 opposite last page



Both feedline (arrow) and vertical storage tanks are heated by flexible electric tape

A temperature-sensitive product in outside storage requires protection from wide climatic variations. Insulation will hold down excessive heat easily enough and at Celanese . . .

Flexible heating tape warms polyvinyl acetate emulsion

THEODORE W. WETT, Assistant Editor
with **HAROLD WEBER,** Chief Design Engineer
Celanese Corporation of America
Newark, New Jersey

Problem: Drum storage space in the warehouse was too small when growing demand upped PVAc production at Celanese Corp's., Linden, New Jersey pilot plant. Bulk storage was needed. Since emulsion was sensitive to heat (temperature must not go over 120°F) and cold (29°F is minimum safe temperature), any outside storage required insulation and provision for controlled heating.

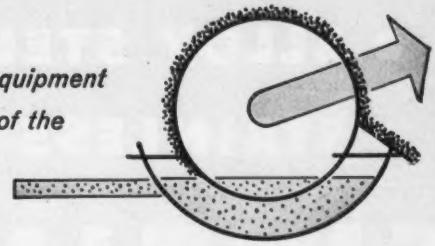
Solution: Two mild-steel storage tanks were erected adjacent to railroad siding for easier loading of tank cars for shipment. Tanks are 8′ in diameter and approximately 23′

DORR-OLIVER POINTERS

A SERVICE TO THE PROCESSING INDUSTRIES

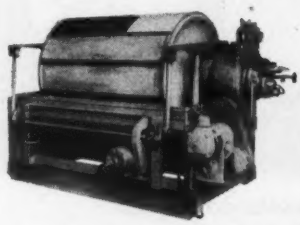
FILTRATION EXPANDS ITS SCOPE

New ideas and equipment pace needs of the processing industries



Pick any processed material, from alcohols to zirconium, and it's dollars to doughnuts that somewhere along the production line there's a filter.

Keeping on top of the many demands made on filtration equipment by modern processing often presents some tricky problems. Take corrosive applications, for instance. With rotary drum type filters, usual practice calls for stainless steel or rubber-covered construction. Capitalizing on advances in materials of construction, our engineers recently developed a filter with all essential components fabricated from tough, glass-reinforced plastics. The plastic construction not only resists corrosion, but it is also lighter and lower in cost than comparable standard machines.



This new filter has been successfully tested in handling acid leach solutions in a uranium mill and is now offered as a regular component of the Dorr-Oliver line.

This development is quoted as another example of the many contributions made by Dorr-Oliver to increase the scope and versatility of filtration equipment. Actually, it's just about impossible to think of any type of filter for any industry that isn't made by Dorr-Oliver and that hasn't been developed or improved by Dorr-Oliver engineers.

We're glad to be able to offer this wide experience and technical knowledge to help you in the solution of any filtration problems. Dorr-Oliver Incorporated, Stamford, Conn.

In the unit operation of filtration, Dorr-Oliver makes:

OLIVER® HORIZONTAL FILTERS • OLIVER CONTINUOUS DRUM FILTERS • DORRCO® INTERNAL DRUM FILTERS • OLIVER-CAMPBELL® CANE MUD FILTERS • AMERICAN® VACUUM DISC FILTERS • SWEETLAND® PRESSURE FILTERS • OLIVER PRE-COAT FILTERS • KELLY® PRESSURE FILTERS • OLIVER TOP-FEED FILTERS • OLIVER PRESSURE LEAF FILTERS • OLIVER DEWAXING FILTERS • OLIVER BLEACH WASHERS • OLIVER SAVEALLS • OLIVER DECKERS

Check 1333 opposite last page

high. A Lithcote lining prevents any contamination of the emulsion. Feed lines, 265′ long, carry material from production area to storage tanks and rail siding.

To maintain desired temperatures in tank and feed line during cold weather, electric heating in the form of flexible tape was installed. Approximately 1900′ of tape was used to provide close to 3 kw of heating capacity. This capacity was divided equally among tanks and feed line.

Two inches of insulation were installed over heating tape. A Variac control was selected for automatic regulation of current supply. Control was set for 70°F.

Results: Electric heating tape maintains temperature of storage tanks and feedline even during prolonged cold spells. Although temperature of materials fell to 51°F when ambient temperature remained near 0°F for a number of days, this was still well above minimum required temperature. Thus, heating system maintains quality of PVAc emulsion in bulk storage.

No maintenance has been required. Currently Celanese is planning to use tanks for storage of polyesters since PVAc manufacture has been moved to larger facilities.

(Thermwire electric heating tape is product of Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.)

Check 1335 opposite last page.

Keep knockin' — someone should be in!"

CAMCO

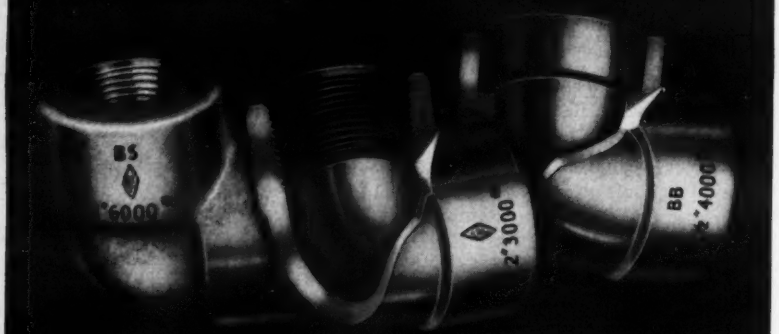
Quality

• FORGED STEEL
• ALLOY STEEL
• STAINLESS STEEL

FITTINGS

2000 Lb., 3000 Lb., 4000 Lb., and 6000 Lb.

SCREWED and SOCKETWELD



CAMCO also manufactures a complete line of 150 Lb. Stainless Steel Fittings.

CP

CAMCO FITTINGS, INC.
North Haven, Connecticut

☐ Catalog covering complete line.
☐ Furnish address of area distributor.

Name .....
Company .....
Address .....
City ..... State .....

THE Quality LINE IN FITTINGS

CAMCO FITTINGS, INC. North Haven, Conn.

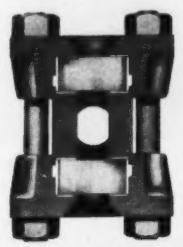
WEST COAST AGENT AND WAREHOUSE / J. J. GATELY CO. 8283 Baldwin Street Oakland 21, California

Check 1334 opposite last page

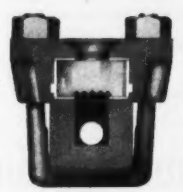
Strahman

HIGH PRESSURE GAUGES

USED IN REFINERIES AND CHEMICAL PLANTS THROUGHOUT THE WORLD



THRU VISION



REFLEX
Single or Multiple Sections

TUBULAR

Gauge Cocks
•
Large Chamber Reflex Gauges
•
Heated or Cooled Gauges

SEND FOR COMPLETE CATALOGUE

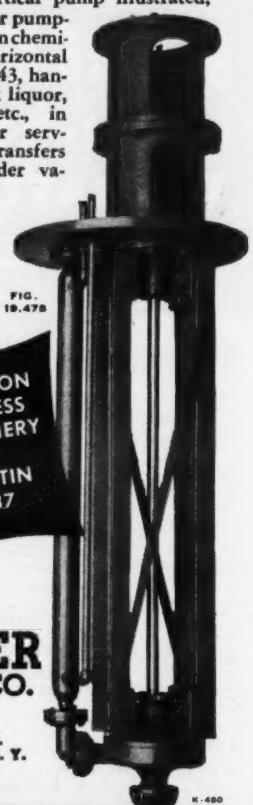
STRAHMAN VALVES, Inc.
16 Hudson St., New York 13, U.S.A.

Check 1336 opposite last page

PUMPING MOLTEN CHEMICALS?

write TABER

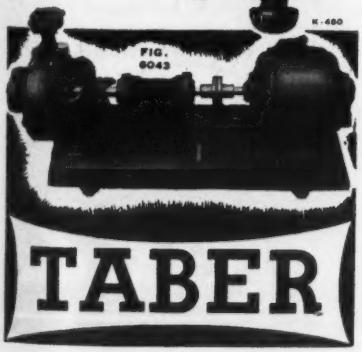
Whatever your pumping needs.. why not put it up to Taber.. long experienced pump specialists. Vertical pump illustrated, 19,478, for pumping molten chemicals. Horizontal pump, 6043, handles black liquor, caustic, etc., in evaporator service; or transfers fluids under vacuum.



WRITE, ON BUSINESS STATIONERY FOR BULLETIN V-837

TABER PUMP CO.

Est. 1859
291 ELM ST.
BUFFALO 3, N. Y.



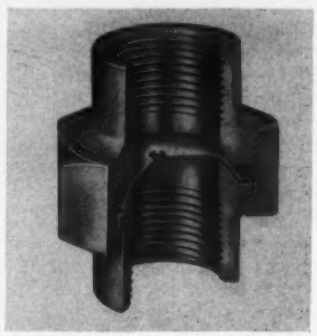
TABER

Check 1337 opposite last page

Stainless orifice plate presents dependability in gasketless unions

Uses: Inserting an orifice for purpose of differential pressure measurement or flow restriction within a pipe line.

Features: Union forms a leak-tight seal around inserted orifice without requiring a gasket. This eliminates consideration of temperature and pressure, thereby extending application range.



Forged steel orifice union eliminates necessity of gaskets

Description: Gasketless orifice union is fabricated from forged steel. It is available with screwed ends or with socket-weld ends. Rating is 1000 psi at 900°F: 3000 psi in cold, non-shock service. Stainless steel orifice plates are available in full range from blank to full pipe opening.

(Gasketless orifice union is product of Catawissa Valve & Fittings Co., Catawissa, Pa.)

Check 1338 opposite last page.

Lightweight pipe, fittings, flanges, and connections are listed in eight-page catalog detailing standard specifications. Bul 59 — Naylor Piping Company, 1230 East 92nd Street, Chicago 19, Ill.

Check 1339 opposite last page.

Hydrogen peroxide — Easy basis for predicting likely range of explosive compositions of untested mixtures containing hydrogen peroxide is outlined in four-page Bul 100 — Becco Chemical Division, Food Machinery and Chemical Corporation, Buffalo 7, N. Y.

Check 1340 opposite last page.

A CHEMISEAL FLUOROCARBON LINING CASE HISTORY

Wyman-Gordon *finds economical answer to handling*

Hydrochloric, Hydrofluoric, Nitric Acids

Chemiseal Fluorocarbon Linings are chemically-inert, tough, and withstand heat and cold (−320° F. to +250° F.).

A CHEMISEAL FLUOROCARBON PLASTIC LINING is used on this truck owned by Wyman-Gordon of Worcester, Massachusetts to assure safe, economical haulage of waste acids. Since April, 1957 the truck has been in continuous service carrying 80% hydrochloric, 13% hydrofluoric, and 7% nitric acid between the company's two Closed Die Forging plants and the disposal area. And the lining is still in perfect condition.

You can make your present plant equipment impervious to acids by applying CHEMISEAL Fluorocarbon Plastic Linings. They can be cemented over most contours and to most materials—metal, wood, concrete, etc. And, to make protection complete, seams are heat fused into a continuous, chemically-inert surface.

CHEMISEAL Fluorocarbon Plastic Linings are available through certified applicators, equipped with factory-trained personnel and specialized equipment. Call the applicator nearest you for more information:

THE BARBER-WEBB COMPANY, INC., LOS ANGELES, CAL.
BELKE MFG. CO., INC., CHICAGO, ILLINOIS
BUCKLEY IRON WORKS, DORCHESTER, MASS.
ELECTRO-CHEMICAL ENGRG. & MFG. CO., EMMAUS, PA.
LINCO, INC., HOUSTON, TEXAS
METALWELD, INC., PHILADELPHIA, PA.

Or write for Bulletin AD-152. Special Products Dept., United States Gasket Company, Camden 1, New Jersey.

United States Gasket *Plastics Division of* GARLOCK

Check 1341 opposite last page

Designed to
PERFORM BEST
in
YOUR
PARTICULAR
APPLICATION

ERIEZ
permanent non-electric
MAGNETIC PULLEYS

Only Eriez – with its years of know-how based on solving magnetic problems of all types for industry – offers such a wide range of PERMANENT MAGNETIC PULLEYS to meet your specific needs. Remove tramp iron or iron fines efficiently, economically, *automatically!* Size for size, Eriez Pulleys provide two to three times greater magnetic fields than limited radial center air gap units. Magnetic strength unaffected by heat or cold. No "weak spots"... magnetic strength extends across entire Pulley face. Standard sizes range from 4" diameter thru 30" diameter and in many belt widths.

MAGNETIC STRENGTH GUARANTEED INDEFINITELY ... NO OPERATING OR MAINTENANCE COSTS • EFFECTIVE FOR WET OR DRY MATERIALS • EASILY, QUICKLY INSTALLED • PROVED IN THOUSANDS OF APPLICATIONS IN EVERY TYPE OF INDUSTRY.

Be sure of getting the most effective unit for your exact needs. Contact us; we'll work closely with your engineers to provide peak performing magnetic equipment at the most economical cost to you.

WRITE TODAY FOR COMPLETE LITERATURE
Eriez Mfg. Co., 73-RB Magnet Drive, Erie, Pa.

ERIEZ

Check 1342 opposite last page

Hydraulic cylinder forms tight seal at all pressures

A pressure-tightening tube seal is feature of manufacturer's hydraulic cylinder line. This O-ring seal is located on the outside diameter of the tube and is fully confined between tube and cylinder head. Because seal is on the tube OD, minute expansion of tube under pressure squeezes the O-ring, increasing tightness of seal.

Cylinders are rated at 2000 to 3000 psi non-shock, and have generous safety margin. Bore sizes range from 1½ through 8". One-piece solid steel heads with welded mountings give added strength to cylinders. Since all mountings are welded, accurate alignment and squareness of mounting are assured.

(Powrdraulic cylinder is product of Hanna Engineering Works, 1765 Elston Avenue, Chicago 22, Ill.)

Check 1343 opposite last page.

Resilient plug facing gives tight shutoff of vacuum valves

Recently developed valve line utilizes plug and body seat which have eccentric- or cam-shaped cross-sections. Plug is carried on journals at either end. It rotates only one-quarter turn from full-open to dead-shut position.

Resilient plug face and seat are in contact only when valve is closed. Leak rate across seat on three-inch valve is less than 0.003 micron cu ft/hr. Stem leak rate, on valves three inches and smaller, is 0.01 micron cu ft/hr.

Valves are available in variety of alloys. Standard-size range is ½ through 20". Valves are available for manual operation or with on-off or positioning-type actuators for automatic and remote control.

(Vacuum valves are product of Dept. V, DeZurik Corporation, Sartell, Minn.)

Check 1344 opposite last page.

Spherical roller bearings have high capacity

Uses: Operation on vibrating screens, crushers, impact pulverizers, construction equipment, mine fans, and oil-field equipment.

Features: Maximum number of large-diameter contact rollers gives bearings high capacity. For bore sizes in range of 1.5748 to 11.0236", dynamic-load ratings are to 288,000 lb.

Description: Precision-machined centrifugally cast bronze retainer results in quiet bearing performance. High heavy inner-race shoulders permit easy assembly or removal of bearings from shaft with conventional shop equipment.

When furnished in pillow blocks, choice of bearing seals is available. Standard blocks are equipped with multi-labyrinth seals of steel construction, suitable for both grease and oil lubrication. Bore-size range of bearings in pillow blocks is 1-7/16 to 10".

Also furnished is Dacron contact seal with self-aligning flexible carrier. This is used for grease lubrication only. Both seals retain lubricants and exclude contaminants, are interchangeable, and are easily assembled into housing.

(Spherical roller bearings are product of Link-Belt Company, Prudential Plaza, Chicago 1, Illinois.)

Check 1345 opposite last page.

Copper tubing and factors involved in its design and production highlight illustrated booklet. Manufacturer's facilities and customer services from important part of "The Measure of Tubemanship"—Wolverine Tube Div., Calumet & Hecla, Inc., 17200 Southfield Rd., Allen Park, Mich.

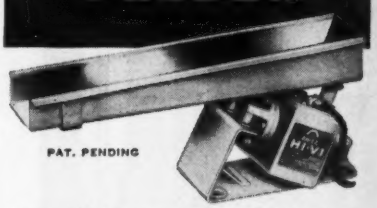
Check 1346 opposite last page.

Fabrication of steel and alloy plate in the 3/16 to 1-¼" range is described in eight-page brochure. Cat 958 — Missouri Boiler and Tank Company, 2211 Papin Street, St. Louis 3, Mo.

Check 1347 opposite last page.

New features in an all new
FEEDER

electro-permanent magnetic
ERIEZ
HI-VI
VIBRATORY
FEEDER



PAT. PENDING

Here's the feeder *you** helped design! Provides accurate, uniform rate of feed of bulk materials – variable from ounces to tons. For spreading, sorting, aerating, cooling, proportioning, mixing, etc. Increases production, reduces maintenance.

TOTALLY ENCLOSED DRIVE ELEMENT FOR LONGER COIL LIFE • NO RECTIFIER NEEDED • SIMPLE INSTALLATION • JUST PLUG OR WIRE INTO A.C. LINE • NEW GLASS FIBER SPRINGS REDUCE BREAKAGE • NEW ELECTRO-PERMANENT MAGNETIC DRIVE PROVIDES GREATER FEEDING CAPACITY THAN COMPARABLE SIZE UNITS • PRE-TESTED AND STABILIZED AT FACTORY.

Industry Users —

ALSO AVAILABLE: Economical, specially constructed units for hazardous, dusty locations ... fully acceptable by Mill Mutual.

WRITE FOR BIG VIBRATORY FACT FILE
Eriez Mfg. Co., 73-RA Magnet Drive, Erie, Pa.

ERIEZ

Check 1348 opposite last page

WHY BORROW?

You can receive a personal copy of CHEMICAL PROCESSING every month.

Do you know that the magazine can come to you personally without charge, to your designated address?

If you . . .

would like to receive it and if you qualify, the publisher will add your name to the more than 50,000 key men in the chemical processing industries who receive each issue regularly.

The necessary qualifications are outlined on the request form that can be found opposite the inside back cover.

Fill it out, being sure to give all necessary information, and mail to Reader Service Department.

Perhaps . . .

others in your company would also like to receive CHEMICAL PROCESSING personally each month. Include their names on the form opposite the back cover.

Your application for subscription is welcomed.

For more information on product at right, specify 1349 see information request blank opposite last page.

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UNARCO®

UNIBESTOS®

—the pipe insulation that's worth more money

There's never a peep from installation or maintenance crews—or from the front office—when UNIBESTOS is specified. It cuts and fits easily . . . goes on faster . . . takes all the heat it's designed for. Sizes to 44" o.d. Temperatures to 1200°F. Write for Catalog F76-321 with exclusive "J" Factor Tables. Union Asbestos & Rubber Company, General Sales Offices: 1111 W. Perry St., Bloomington, Illinois. Distributors in principal cities.

ALL-NEW ALEMITE "77" LUBRICANT PUMP

packs most power

FOR HIGHEST PERFORMANCE!

68% More Powerful . . . outperforms any other air-operated lubricant pump of its class on the market today! The all-new 5.2 horsepower Alemite "77" Pump assures smoothest, fastest delivery of all lubricants, through longest lines!

Three Master Pressure Ratios for unequalled delivery of all lubricants – fluid, semi-solid and heavy fibrous types. Lightweight, rust-proof aluminum construction.

Precision Engineered from finest quality materials–designed for outstanding ease of operation and maximum performance. Models for 120-lb. or 400-lb. drums – for all industrial applications.

All-New Alemite "77" Features!

• **Volume Air Distributing Valve**—self-seating, self-cleaning, volume porting • **Modern-Design, Highly Efficient Toggle Trip Mechanism** provides balanced pressure on shuttle . . . won't bind • **Straight-Line Exhaust** has extra-large port for highest pump efficiency • **Hardened Steel Piston and Cylinder,** lapped to a precision fit of 125 millionths of an inch • **All-Steel Primer Valve,** ground to a perfect seal . . . hardened for abrasion resistance • **Dynamic Primer** assures priming and pumping of heaviest lubricants.

THREE POWERFUL "77" MODELS

• **High-pressure** (40 to 1 ratio) for light-bodied and fibrous greases. Delivery on both up and down stroke.

• **Medium-pressure** (25 to 1 ratio) for heavyweight oils and light-bodied greases. Delivery on both up and down strokes.

• **Volume delivery** (6 to 1 ratio) for light-bodied fluid lubricants. Single-acting pump mechanism.

Write for New Alemite "77" Pump Catalog!

Symbol of SW Excellence

ALEMITE DIVISION
STEWART-WARNER CORPORATION

Dept. K-49, 1850 Diversey Parkway, Chicago 14, Illinois

Check 1350 opposite last page

Waterproof insulation is lightweight and easily installed

Simplified-packaging method saves handling costs

Uses: For insulation, particularly under built-up roof.

Features: Insulation has permanently low thermal conductance. Need for vapor barriers in most situations is eliminated. Lightweight material and simplified packaging expedites handling.

Description: Insulation is two- by four-ft board of polystyrene completely enclosed in asphalt-laminate

Roof insulation is applied to asphalt coating. It is designed particularly for insulation under built-up roofs

kraft wrapper. It is available in 1, 1¼, 1⅝, and 2" thicknesses. Water-vapor transmission is 0.4 to 0.5 perms.

Kraft-paper laminate construction offers complete compatibility with standard methods of installing hot asphalt or hot tar roof. Physical characteristics are as follows:

Thermal conductance, Btu/hr/sq ft/°F	0.30 at 70°F
Density, lb/cu ft	Less than 4.5
Compressive strength (16 to 32 psi)	3% deflection
Flexural strength, psi	177 to 197

(Roofmate roof insulation is product of The Dow Chemical Company, Midland, Mich.)

Check 1351 opposite last page.

Compressed air filters are described in four-page bulletin. Booklet includes technical information and charts on flow characteristics, and physical dimensions. Bul GEO-507—Commercial Filters Corporation, 2 Main Street, Melrose, Mass.

Check 1352 opposite last page.

THAT'S INTERESTING

Woosh!

Chemical reactions so fast they last only a billionth of a second may result from research into fundamentals of fluorescence being conducted by Eastman Kodak Research Laboratories.

Uncle S. wants inventions

Supplement to listing of some 380 technical problems affecting the nation's defense, prepared by National Inventors Council, contains 80 new problems and 50 revisions of old problems. (*Digest*, Association of American Soap & Glycerine Producers, Inc.)

They like their work

Poll of 1948 graduates of Lehigh University show 41% still work for same employer; 29% have changed jobs once, and 28% have changed more than once.

For more information on product at right, specify 1353 see information request blank opposite last page.

FALK All-Motor Motoreducers driving pipe conveyors in seamless tube mill.

Photo courtesy of The Colorado Fuel and Iron Corporation

You get these "extras" when you buy FALK *all-steel* Motoreducers

1. **Freedom from damaged housings.** The exclusive FALK *all-steel* construction gives full protection from cracked housings or torn-off feet...plus twice the ability of cast iron to maintain vital alignment.
2. **12-15% reserve load-carrying capacity** in the gears, by AGMA standards. The extra-depth, high pressure angle helical gears are another FALK exclusive ...they assure better operation and longer gear life.
3. **Highest known gear efficiency**—98½% per gear train under full load! This means maximum productive work for your power dollar.
4. **Longer service life**...advanced FALK design makes it possible to machine both bores for each shaft assembly at one time, thus eliminating possible accumulation of tolerances that occurs when individually machined parts are assembled. The result—better alignment of revolving elements that permits units to transmit rated capacity longer.
5. **Standard units to fit your needs.** Integral and All-Motor® Motoreducers are available in horizontal, vertical and right angle types...a type for every use.

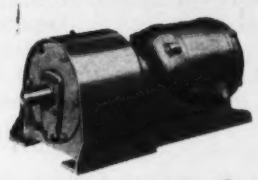
Units are available up to 75 hp; output speeds from 780 rpm down to 1.2 rpm. Prompt delivery from factory, warehouse or distributor stocks. Ask your FALK Representative or Authorized FALK Distributor for *Bulletin 3100.*

THE FALK CORPORATION, MILWAUKEE 1, WIS.

MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

Representatives and Distributors in most principal cities

FALK ...a good name in industry



THE FALK ALL-MOTOR® MOTOREDUCER
the original All-Motor unit

(Shown) Horizontal concentric model. Also available in right angle and vertical types.

THE ALL-STEEL FALK® SHAFT MOUNTED DRIVE

Proved best for the countless industrial applications where a reducing unit mounting directly on shaft of the driven machine is indicated.

Units from 1/2 to 50 hp. Ratios —4:1, 14:1 or 24:1. Torque capacity up to 41,000 lb-in (in standard units). Prompt shipment from stock. For details, ask for *Bulletin 7100.*

Dust Control is a job for Engineers

The "rule of thumb" methods of the inexperienced, or the "engineering rules" of an experienced design, fabrication, and installation firm—which will you select for your dust control problems?

Kirk and Blum offers you . . .

ENGINEERING—a staff of qualified engineers with proven ability to solve your dust control problems.

RESEARCH—continuous research on full scale equipment, to develop the most efficient systems.

EXPERIENCE—over 50 years of dust control service.

Every Kirk & Blum installation is based on a complete service: Design — Fabrication — Installation, backed by K & B's acceptance of One Undivided Responsibility for the system to assure your satisfaction.

On your dust control problem consult Kirk and Blum, craftsmen in dust control, where fine craftsmanship is appreciated. The Kirk & Blum Manufacturing Company, 3133 Forrer St., Cincinnati 9, Ohio.

KIRK & BLUM DUST CONTROL SYSTEMS

Check 1354 opposite last page

N.F.M. makes a FULL LINE of Filter Media!

Call on NFM for Filter Cloths made from:

VINCEL	ORLON**
DYNEL	TEFLON***
NYLON	GLASS
SARAN	POLYETHYLENE
DACRON*	POLYMAX†

We offer you a full line from which to find the answer to your filter cloth problems. These cloths cover a wide range of resistance to heat, resistance to attack by acids, mold, fungi, alkalies and bacteria, retention of fines, etc. And, because we make a number of different cloths, we are in a position to recommend the best cloth to solve your problem. Our policy is to provide you with the best cloth available to do the job.

For test samples, and recommendations based on our many years of experience, write us giving full details of your filter operations.

Remember, too, we have facilities for making up filter element covers from any of the available fibers, sewed with thread of the same resistance properties as the yarn that goes into the cloth.

*TM — Du Pont Polyester Fiber
**TM — Du Pont Acrylic Fiber
***TM — Du Pont Tetrafluorethylene Fiber
†TM — National Filter Media Corporation

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Los Angeles, Calif.: 416 West 8th Street
Chicago, Ill.: 6034 N. Cicero Ave.
Elizabethton, Tenn.: Paul Chapman Assoc., Box 787
Cincinnati, Ohio: Roselawn Center Bldg.
Houston, Texas: 1503 Hadley Street
Pensacola, Fla.: Chem-Quip Co., 1102 Texar Drive

Check 1355 opposite last page

Air dryer utilizes agitation, dessication, scrubbing

Uses: Drying and cleaning of compressed air.

Features: Air dryer utilizes gyratory agitation, dessication, and scrubbing.

Description: Compressed-air dryers extract water vapor by reducing vapor to 0°F dewpoint. Dryers are constructed of steel in accordance with ASME Code.

Delivered air contains no carryover of any kind from unit. Pressure drop is less than 1%. Air temperature remains constant during process.

Dryers are available in standard models with vessel capacities ranging up to 8000 scfm and 6000 psig. Larger models, higher-pressure units, and dryer-receiver combination units can be obtained.

(Van-Air Dryers are product of Van Products Co., Erie, Pennsylvania.)

Check 1356 opposite last page.

Gas flowmeter is given Class-I, Group-D OK

Uses: Safe detection of flow in large gas-line systems.

Features: Flowmeter is UL-approved for use in presence of Class I, Group D flammable and explosive mixtures.

Power is limited to less than 1/10w. Resulting temperature rise on thermal elements never exceeds 31°C. This permits remote indication of mass flow in gas lines.

Description: Flowmeter is calibrated in true mass flow. This eliminates necessity of corrections for temperature and/or pressure. Instrument is operated on 110v 60-cy AC. Transformers are hermetically sealed.

Probe tube is 304 stainless steel with ⅞" outer diameter. Standard length is 24". Packing gland with probe is suitable for installation in 1½" gate valve and makes gas-tight fit to probe.

(Gas flowmeter is product of Hastings-Raydist, Inc., Hampton, Virginia.)

Check 1357 opposite last page.

Trapping Standardization

. . . steam trap standardization plus standardized hook-ups spell lower maintenance costs

An important weapon in the fight against rising maintenance costs is standardization. It can reduce the variety of maintenance problems and simplify those which remain.

Since we specialize in steam traps we'd like to offer some suggestions for a trapping standardization program. Such a program involves standardization on one make of trap and standardization of hook-ups.

Trap Standardization

The advantages of standardizing on a single make of trap are important and can make a big difference in the cost and ease of repairs because—

1. You can carry a more complete stock of repair parts with a smaller inventory.

2. Maintenance personnel has the opportunity to become expert on one make rather than be "jacks of all traps."

3. As an exclusive user of one make of traps you become a preferred customer of your trap representative and can be sure of getting the best possible service.

4. You can enjoy the advantages of standardized hook-ups.

Standardized Hook-ups

Standardized hook-ups facilitate and reduce the cost of both original installation and maintenance. By adopting standards for the dimensions of all fittings, including nipples, each hook-up for a given size of trap is identical and can be fabricated in the pipe shop.

Unions should be used so that when a trap needs repair, the unions can be uncoupled, the trap lifted from the line and a spare carrying identical length nipples and half unions slipped into place. In as little as a minute or two a faulty trap can be replaced. The faulty trap can go back to the storeroom for repair when convenient and then be put into stock as a spare.

Figure 1 shows a typical standardized hook-up used by a major chemical manufacturer. Note how

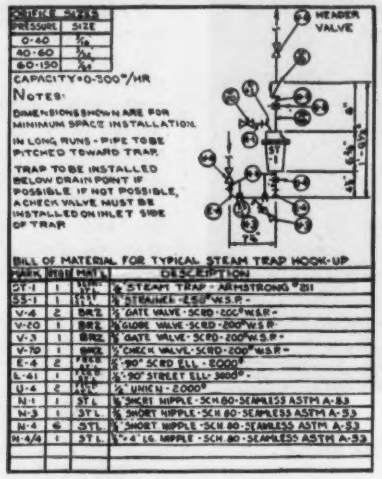


Fig. 1—Typical standardized installation hook-up used by a leading chemical manufacturer.

the hook-up provides the following advantages:

1. Test valve in trap cap permits fast, easy checking of trap operation.
2. Strainer ahead of trap protects it against dirt and scale.
3. Blowdown valve in strainer provides easy cleaning.
4. Check valve in discharge line isolates trap when test valve is opened.
5. Shut-off valves and unions ahead of and following trap permit removal of entire trap from line.

Fig. 2—Armstrong traps have only two moving parts—the lever assembly and the bucket. Nothing much to go wrong here.

Another important consideration for getting the most from a standardization program is accessibility of the traps. Insofar as is possible, traps should be located so that they are convenient for inspection. The easier it is to locate and get at a trap, the less likelihood that it will be overlooked.

What Make of Trap? (This is the Commercial)

Obviously, a trap standardization program shows the best results when the make of trap selected is the one that gives the best service. Naturally, we think the make should be Armstrong and fortunately a lot of trap users agree. Here are some of the advantages of standardizing on Armstrong that have been pointed out by these users:

1. *Armstrong traps work.* They don't leak steam and they do discharge condensate and air as fast as they reach the trap. And they work with any return system.

2. *Armstrong traps aren't "prima donnas."* They need no special care or coddling. Valve and seat are hardened chrome steel. Lever assembly and bucket are stainless steel and these are the only moving parts.

3. *Armstrong traps aren't "orphans."* You can *always* get parts and service from nearby Factory Representatives and stocking distributors.

4. *Armstrong traps are guaranteed.* If you're not *completely* satisfied you can return the traps for refund of purchase price.

More Information

The 44-page Steam Trap Book (free on request) gives a lot more facts on trap selection and installation. Call your local Armstrong Representative or write

Armstrong Machine Works
8807 Maple Street
Three Rivers, Michigan

ARMSTRONG STEAM TRAPS

Check 1358 opposite last page

Master of Every Nut and Bolt...

NEW RIDGID®

Hex Wrench

Wide-open fast-action multi-sided grip on every hex, square and flathead!

Quick adjustment—stays to size . . . this new Hex Wrench goes on easily, won't slip off—harder you pull, the tighter it grips . . . no more skinned knuckles or rounded nut shoulders! Narrow jaw for close quarters. Famous RIDGID heavy-duty design, guaranteed housing, comfort-grip handle. Three sizes for ⅜" to 2" nuts. Make your work easier and faster—buy new RIDGID Hex Wrenches at your Supply House!

THREADED PIPE... *It's Tight... It's Best... Costs Less!*

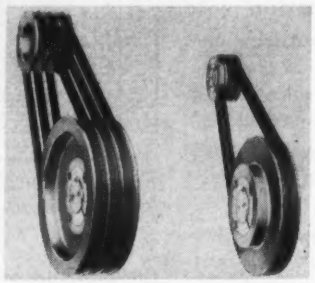
Check 1359 opposite last page

Light, small sheaves with V-belt drives

Uses: Taper-lock drive applications.

Features: Most industrial drives can be handled with ⅜" belts. Sheaves of 1 to 10 grooves are designed for use with this width of belt for drives of 1 to 50 hp. Light, small sheaves save space and prolong bearing life.

Description: Taper-lock bushings are incorporated in sheaves. Belts have crowned tops and concave sidewalls.



V-belt drive (right) handles industrial drives ranging from 1 to 50 hp with ⅜" belt. Conventional Taper-lock drive is shown at left

Other-than-⅜" widths of belts with corresponding sheaves are available for use for power requirements of up to 1500 hp.

(Dyna-V-belt drives are product of Dodge Mfg. Corp., Mishawaka, Ind.)

Check 1360 opposite last page.

Lighting fixtures for ceiling and wall that are vapor-tight are listed in a 12-page catalog which includes dimensional data, specifications, outline drawings, and application information. Vaportight Section F — Stonco Electric Products Co., 333 Monroe Avenue, Kenilworth, N. J.

Check 1361 opposite last page.

Blowers and gas pumps are listed in brochure. Rotary positive-pressure blowers and gas pumps with vertical or horizontal mounting are illustrated and fully specified in Blower and Gas Pump Brochure—Sutorbilt Corporation, Subsidiary of Fuller Company, 2966 E. Victoria St., Compton, Calif.

Check 1362 opposite last page.

Drive out

FOUL AIR

Blow in

FRESH AIR

with Coppus Type A Ventilator

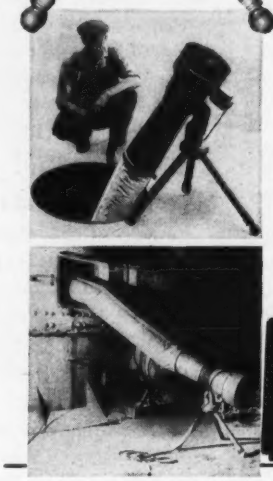
Assure greater safety, comfort for workers . . . get greater efficiency.

Drive out dangerous fumes, gases, stagnant or hot air from boilers, cable manholes, tanks, vats and other confined places. *Supply fresh air continuously.*

Send now for further information. Coppus Engineering Corporation, 384 Park Avenue, Worcester 2, Mass.

MANHOLES made safe for workers' entrance within minutes.

BOILER AND TANK INTERIORS cooled by Coppus. Fresh air supplied continuously.



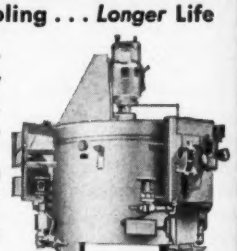
ANOTHER COPPUS "BLUE RIBBON" PRODUCT

Check 1363 opposite last page

KETTLES AND JACKETS

***Faster* Heating and Cooling . . . *Longer* Life**

- 5 Gallon to 325 Gallon Capacity Kettles for Waxes, Oils, Resins, Salts, Asphalts.
- TRENT "Folded-and-Formed" Heating Elements in Metal Inner Liner.
- Complete Temperature Control to Prevent Overheating, Scorching, Hot Spotting.
- Jackets for Retorts, Reactors and Autoclaves.



- High Temperature Uniformity to 2000°F.
- Compact, Space Saving Design.
- Low Thermal Inertia—High Dielectrical Strength (600V).
- Economical Installation and Maintenance.

WRITE FOR BULLETIN 72-TE

TRENT INC.

Electrically Heated Industrial Equipment

235 LEVERINGTON AVE., PHILADELPHIA 27, PA.

In Canada Supreme Power Supplies Limited, Toronto 14

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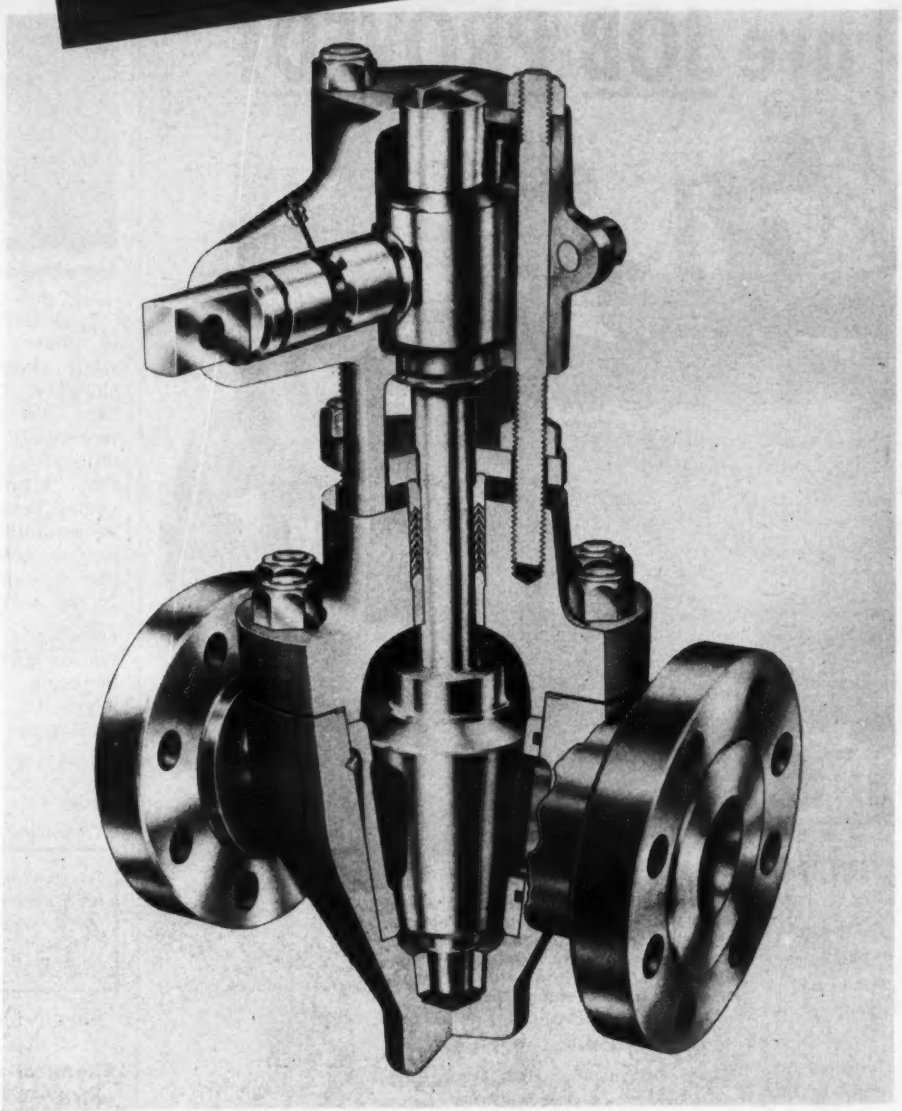

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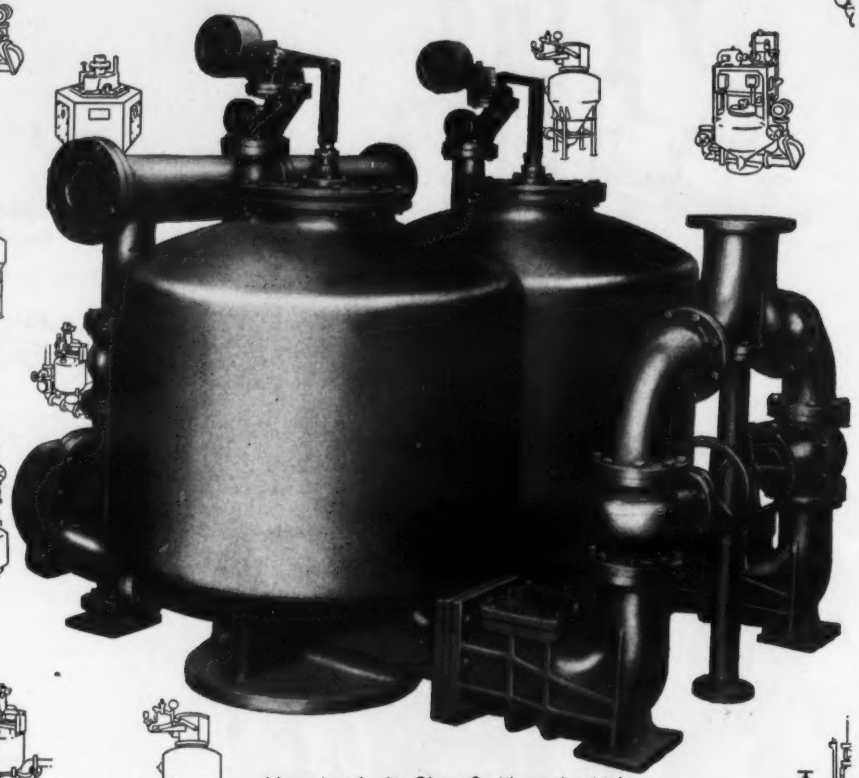

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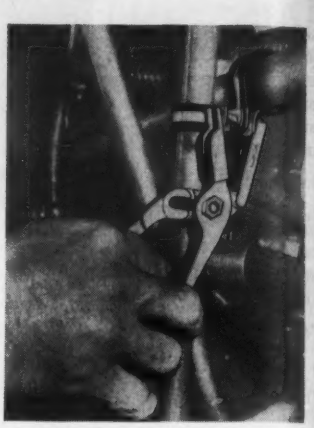

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(Model No. 82 line clamp pliers are product of TA Manufacturing Corporation, 4607 Alger St., Los Angeles 39, California.)

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For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

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(Dynel work clothes are product of Worklon, Inc., affiliate of Mercantile Uniforms, Inc., 253 W. 28th St., New York, New York.)

Check 1368 opposite last page.

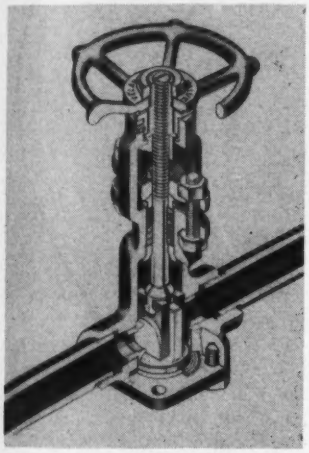
Body-bonnet leakage in gate valves is eliminated

Seats, wedge, and stem quickly replaced

Uses: In gate-valve applications.

Features: One-piece, bonnetless valve eliminates body-bonnet leakage. Service and guide cover permits quick replacement of seats, wedge, and stem without removing valve from line.

Description: Forged-steel gate valves are available with any trim, for 600- and 1500 psi service, and in ½ to 2" sizes. Precision-machined guides eliminate wedge dragging.



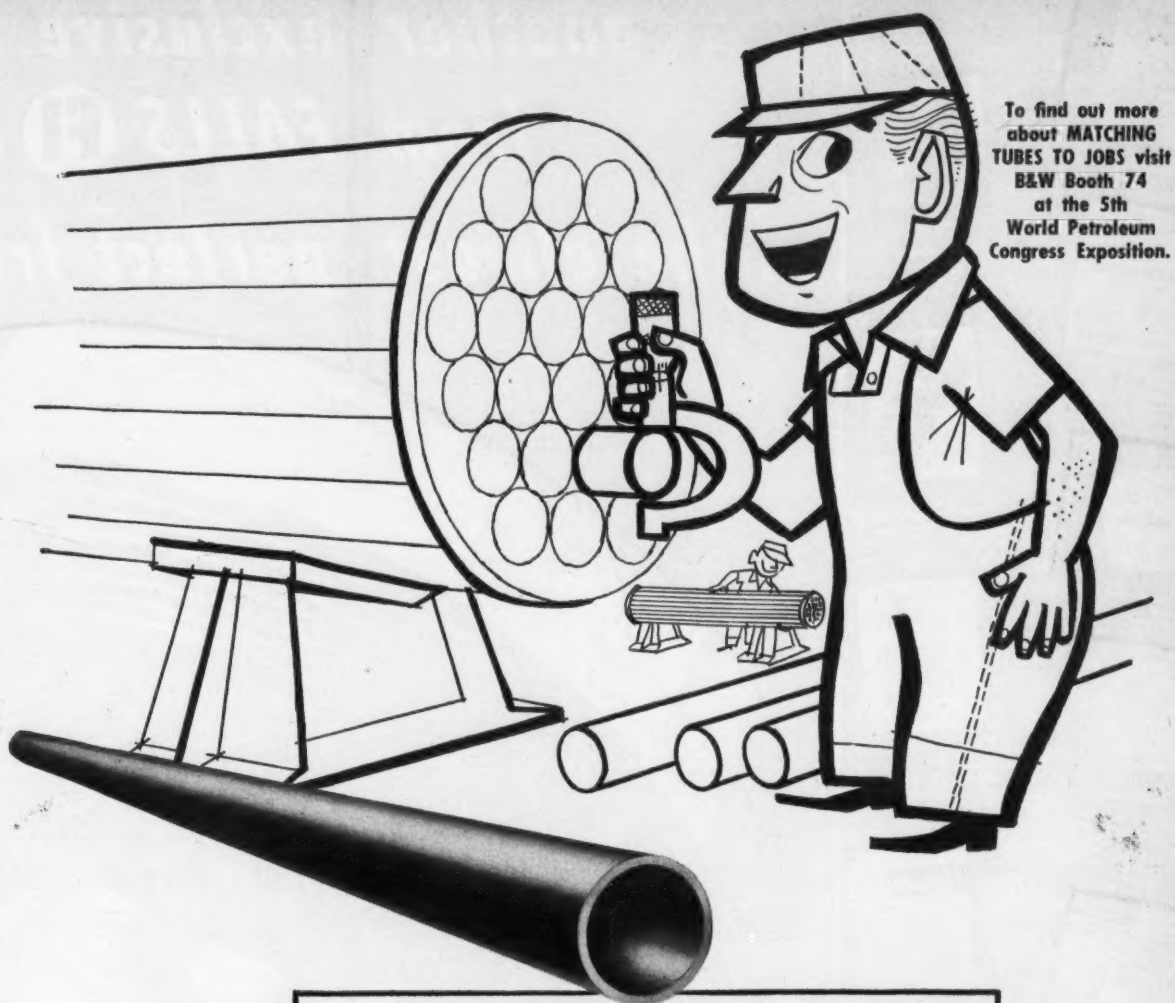
Gate valve has all working parts in same body

Testing for seat tightness is accomplished by closing valve and removing drain plug in bottom cover. This is done either under full pressure or during shutdown periods, by applying air pressure from small test rig.

With valve fully open, stainless-steel, replaceable back seat — hardened, ground, and lapped — provides permanent back-seating and preservation of packing rings. Packing rings consist of six high-pressure high-temp asbestos rings.

(Bonnetless gate valves are product of Velan Valve Corporation, Beeckmantown Rd., Plattsburg, N.Y.)

Check 1369 opposite last page.



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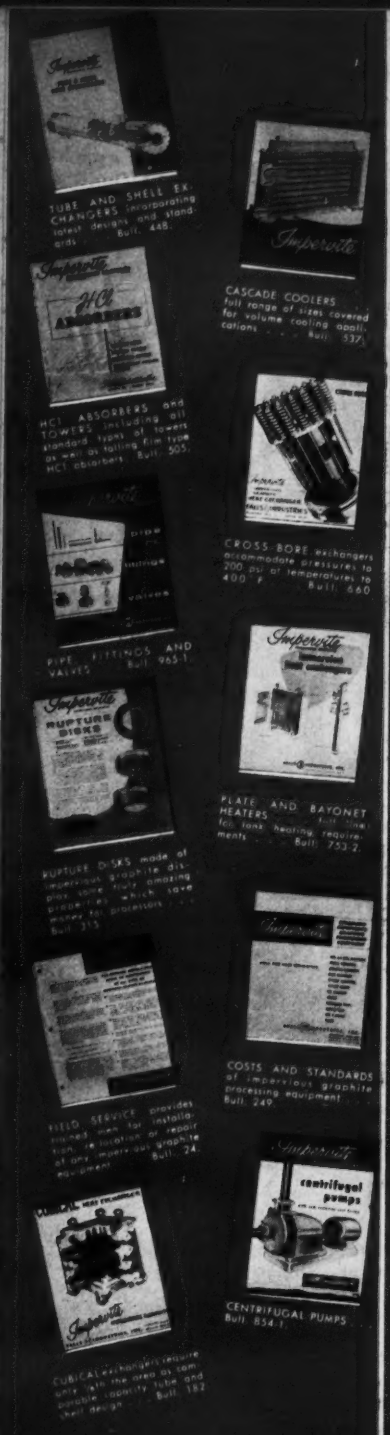
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Organic Electrode Processes

Reviewed by
SAMUEL P. MASSIE
Fisk University

In the foreword, Dr. C. L. Wilson, commenting on Dr. Milton J. Allen's 174-page monograph on "Organic Electrode Processes," states, "in inorganic chemistry the electrochemical method is both well understood and widely used, but in organic chemistry the reverse is true."

This book represents an attempt to change that situation and to pull together much of the significant information on electro-organic chemistry. It is this reviewer's opinion that Dr. Allen has done a very good job.

Following introductory chapters in which general principles of electrochemistry, instrumentation, and techniques are presented, there appear three excellent chapters on cathodic reductions, nitrogen compounds, carbonyl-type compounds, and miscellaneous cathodic reductions.

In the same manner, two chapters on anodic oxidation are given. One of these is on fatty acids and their salts, and the other is on aliphatic, heterocyclic, and aromatic compounds. A third chapter deals with anodic substitution.

Book is well-indexed, with a list of references appearing at end of each chapter.

To obtain "Organic Electrode Processes" remit $6.50 direct to Reinhold Publishing Corp., 430 Park Avenue, New York 22, New York.

Process Dynamics

As the author points out in the preface, purpose of this book is to explain process physics. Written by the late Donald P. Campbell, consulting engineer, and formerly associate professor of electrical engineering at M.I.T., the 316-page work discusses the characteristics of various processes under unsteady-state conditions or in response to periodic disturbances.

Basic definitions of process dynamic performance are changed into mathematical form so that their influence upon process control system design can be shown.

The book is divided into six chapters: 1) Kinematics of Materials Handling, 2) Fluids in Motion, 3) Forming, Propulsion, and Guidance, 4) Thermal Process Dynamics, 5) Mass Transfer Dynamics, and 6) Chemical Process Dynamics. Series of problems for each chapter are listed toward end of book.

Two appendices are included. These deal with block diagrams and signal flow diagrams for evaluating dynamic behavior of processes, and use of Fourier and Laplace transformations in treatment-process control problems.

Amply illustrated with charts, graphs, tables, and diagrams, the book also discusses applications of feedback control theory to various industrial processes, emphasizing chemical and petroleum operations. It cites a practical approach to problems such as automatic process control and damping of pressure and flow pulsation.

The text is not recommended for beginners in the process control field. Engineering students and practicing engineers should have some knowledge of differential equations and the Laplace

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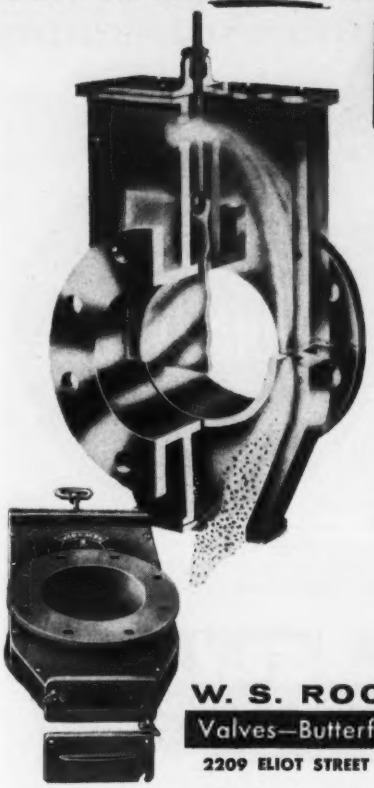

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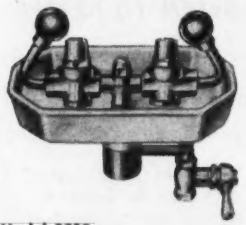

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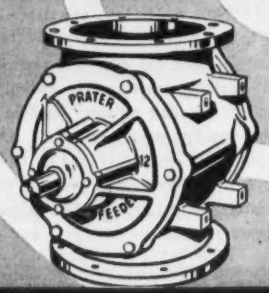

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transformation before attempting to tackle it. Familiarity with principles of automatic feedback control is also suggested.

To obtain "Process Dynamics" remit $10.50 direct to John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, New York.

Check 1376 opposite last page.

Fluid Dynamics and Heat Transfer

Reviewed by
DR. JAMES H. GARY
University of Alabama

This book was designed for a one-semester graduate text in a course relating the fundamentals of fluid flow and convective heat transfer. The authors, James G. Knudsen and Donald L. Katz of the University of Michigan, did an excellent job of presenting the material in a manner suitable to both college students and engineers engaged in research and development work in these fields.

Approximately two-thirds of the 576-page book treats the subject of fluid flow, starting with the basic continuity equations and expanding them to include not only fluid flow in pipes and channels, but also flow patterns in mixers, recent studies of flow in entrances, and the flow of molten metals in centrifugal casting equipment.

Section on heat transfer discusses convective heat transfer inside and outside finned and unfinned tubes in shell-and-tube heat exchangers, heat transfer from immersed bodies, and liquid-metal heat transfer.

A great deal of the recent material on the analogy between fluid flow and heat transfer is used to connect the subjects in a logical manner, and sufficient example problems are included to enable the qualified reader to assimilate the material by self-study.

To obtain "Fluid Dynamics and Heat Transfer" remit $12.50 direct to the McGraw-Hill Book Company, 330 West 42nd St., New York 36, N.Y.

Cellulosics

This is the fifth book in a series being presented to help people in the plastics or allied industries to determine the optimum applications for plastics. The series is semi-technical in that one does not need to be a chemist to understand the various volumes.

The current 270-page volume on cellulosics is authored by Walter D. Paist, Plastics Division, Celanese Corporation of America, Newark, New Jersey. It presents a clear, concise survey on the applications of cellulosics based on their properties.

To help orient the reader, brief background on production and properties of the material are given. However, the major emphasis is on applications. These latter include fibers, films, molding powders, protective coatings, adhesives, thickening agents, and a wide variety of other uses. Reasons for the selection of any particular cellulosic for an application are thoroughly explained, and provide some basis for the consideration of these materials for the reader's own uses.

The final chapter deals with an appraisal of the industrial future of cellulosics. Work done by the U. S. Department of Agriculture, the Institute of Textile Technology, the National Bureau of Standards, state universities, and private industry is discussed.

To obtain "Cellulosics", remit $5.75 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.

The Book of pH

Reviewed by
DANA S. DAVIS
Pasadena, Texas

R. B. Webber's "The Book of pH" is, as he states, "a simple and complete description of the theory and practice of the measurement of pH as applied to science and industry." Found in text are discussions of a large variety of pH control applications in agricultural, bacteriological,

chemical, electroplating, laundry, tanning, ore processing, papermaking, pharmaceutical, printing, and textile industries.

A considerable amount of theory is presented in relation to aqueous and nonaqueous solutions. Colorimetric and electrical methods of pH measurement are two of several topics that take up laboratory procedures.

The subject is covered in 111 pages on high-quality coated paper. A gray, artificial leather, hard-back cover complements the excellent typography and attractive illustrations. Of the 40 plates, six are in color. There are several useful appendices. One includes a list of the elements with symbols, atomic numbers, and atomic weights.

Another section discusses essentials of logarithms and how they are used. Fully worked problems are included.

To obtain "The Book of pH" remit $6.00 *direct to the Macmillan Company, 60 Fifth Avenue, New York, N. Y.*

Check 1377 opposite last page.

Mechanisms of Inorganic Reactions

Reviewed by
SAMUEL P. MASSIE
Fisk University

"The renaissance of inorganic chemistry" during the past two decades calls for a book devoted to study of metallic complexes in solution, particularly the kinetics and mechanisms involved in their reactions. Doctors Basolo and Pearson, both of Northwestern University, who themselves are actively engaged in research on metal complexes, have more than adequately fulfilled this need in their 426-page treatise.

This is not a book for the beginner in this field. The authors assume some prior knowledge of coordination chemistry, stereochemistry, and reactions kinetics. Yet, workers in other areas, like the reviewer, who is an or-

To page 185

How to beat the high cost of temperature control

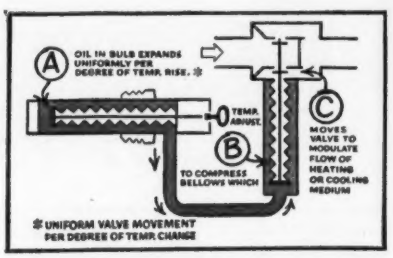
The practical approach to temperature control

By John W. Ritter, Test Engineer, SARCO Company, Inc.

Precise temperature regulation is essential in many processing operations, not only for quality control, but for maintenance of output as well.

Manual temperature control is unsatisfactory because of the possibility of spoilage and loss of quality control which can result from irregular or indifferent hand regulation.

Automatic controls are available in a wide variety, including pneumatic, electronic, and self-powered. Pneumatic and electronic controls are relatively expensive to purchase and install, and may require frequent maintenance. However, in most applications, control requirements can be achieved very successfully by the use of relatively simple, economical Sarco Self-powered Regulators.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OIL IN BULB EXPANDS UNIFORMLY PER DEGREE OF TEMP. RISE. *
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B
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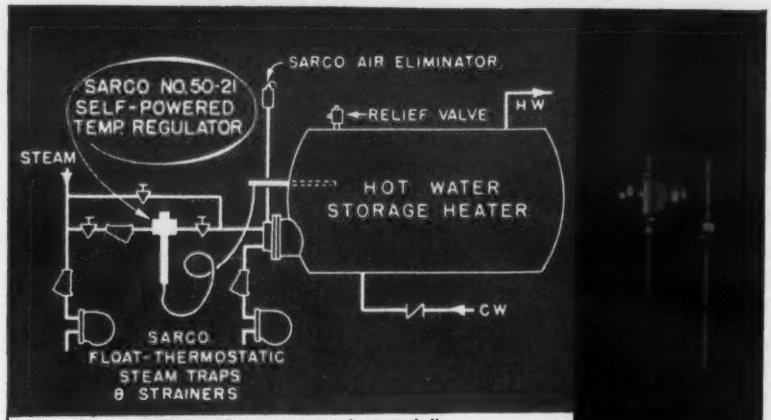
C
MOVES VALVE TO MODULATE FLOW OF HEATING OR COOLING MEDIUM
* UNIFORM VALVE MOVEMENT PER DEGREE OF TEMP. CHANGE

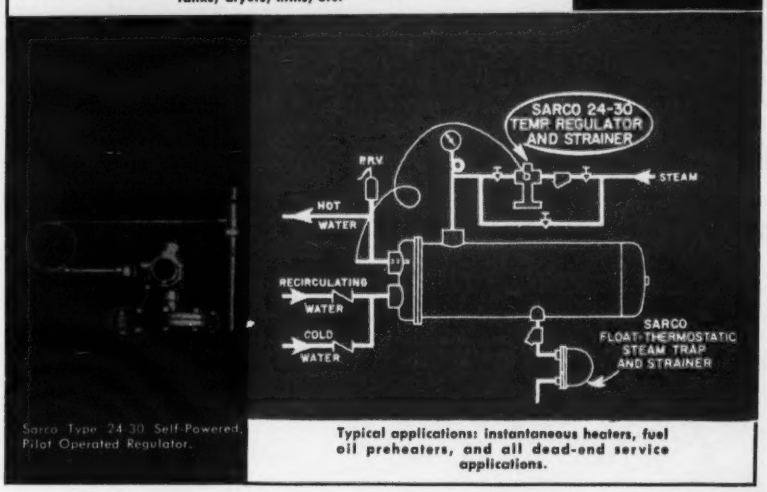
This drawing shows simplicity of operation of the Sarco 50-21 Temperature Regulator, which consists of a thermostat, capillary tubing, and a valve.

Sarco controls, like the 50-21 and the 24-30, have the required degree of sensitivity and dependability, combined with the ruggedness inherent in the sealed capillary tube construction. Because these Sarco controls do not depend on external power, such as electricity or compressed air, they have established long records of sustained, reliable operation. They are an economical and practical solution to the problem of maintaining continuous watchdog duty over processing temperatures.



Typical applications: hot water storage heaters, shell and tube heat exchangers, condensers, oil storage tanks, dryers, kilns, etc.

Sarco Type 50-21 Self Powered Regulator.



Sarco Type 24-30 Self-Powered Pilot Operated Regulator.

Typical applications: instantaneous heaters, fuel oil preheaters, and all dead-end service applications.

Self-powered automatic temperature regulators by SARCO . . .

have these 5 marked advantages: No compressed air or electrical wiring required. No delicate mechanisms to adjust or maintain. No packing glands to stick or require maintenance. No shutdown during power failure. No specialized maintenance required.

Sarco Self-Powered Controls are self-contained and can be installed by any pipe fitter. They are so reasonable in cost that you can afford Sarco automatic heating controls for every application in your plant. Write for 10-page Sarco Control Bulletin No. 620.

6346-B

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STEAM TRAPS • TEMPERATURE CONTROLLERS • STRAINERS • HEATING SPECIALTIES

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AT ROHM & HAAS CO.—

10-year service record

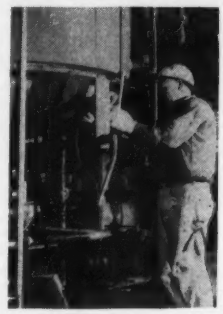
backs new use of **FOAMGLAS®** insulation

Ten years ago, Rohm & Haas Company picked FOAMGLAS to insulate all piping and equipment in a huge new industrial chemicals plant the company built in Deer Park, Texas. Since that time, they've had virtually no insulation maintenance—and the insulation serves as effectively today as when it was installed.

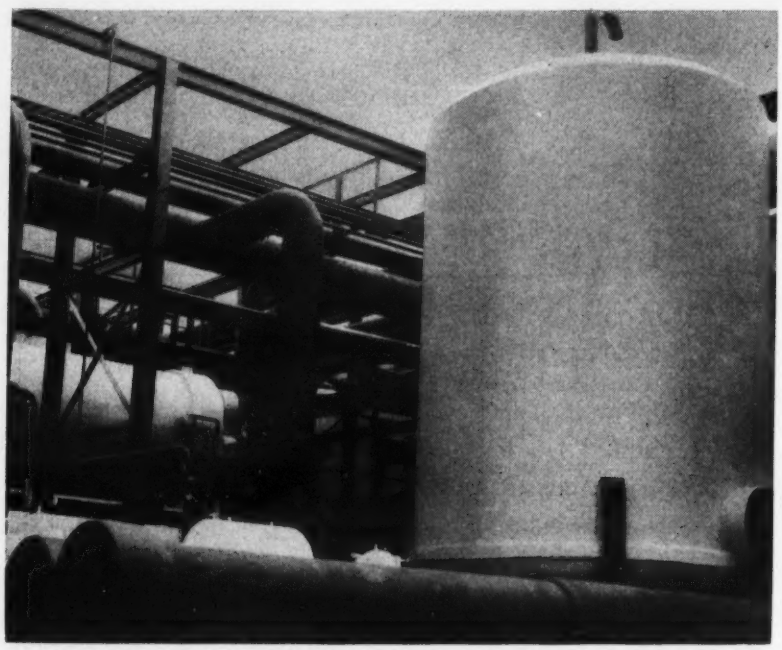
That service record led R & H to pick FOAMGLAS to insulate all piping and equipment for the Deer Park plant's new low temperature processing unit (pictured below).

What makes FOAMGLAS such an effective industrial insulation? This unmatched combination of benefits: FOAMGLAS seals out all moisture to insure insulating efficiency that cannot vary. It is acid-proof. It can't burn. It's quick and easy to install and needs little or no maintenance.

Next time you face the problem of insulating piping or equipment, let Rohm & Haas' experience be your guide. Pick FOAMGLAS. Complete information on this unique cellular glass insulation is contained in our new industrial insulation brochure. To get your free copy, write Pittsburgh Corning Corporation, Department CP-49, One Gateway Center, Pittsburgh 22, Pennsylvania.



Lightweight, easy to cut and shape, FOAMGLAS saved installation time and money for Rohm & Haas. Installation by the Aber Company.



Proof against moisture, fire and acids, FOAMGLAS cuts insulation maintenance here.

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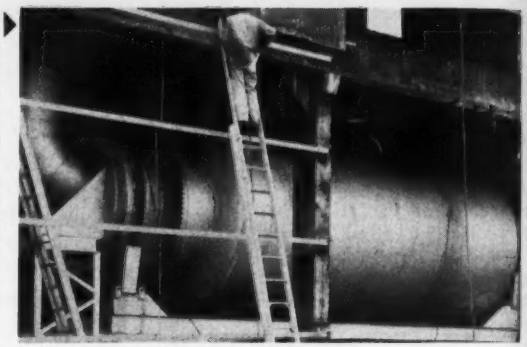
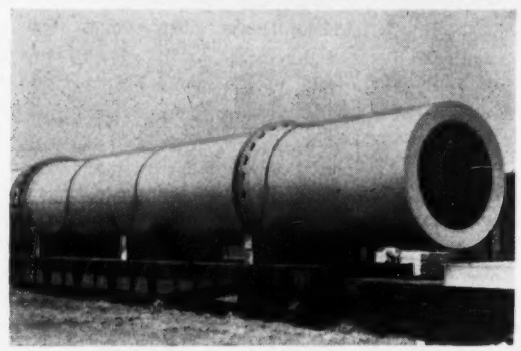
for the Chemical Industry

Renneburg DehydrO-Mat Cooler (Patented) — This counter-current cooler features dustless operation, large capacity, compactness, and positive *controlled* unloading.





Renneburg 8' dia. x 70' Straight Shell Dryer — Other dryers and coolers available in a wide variety of sizes and capacities.

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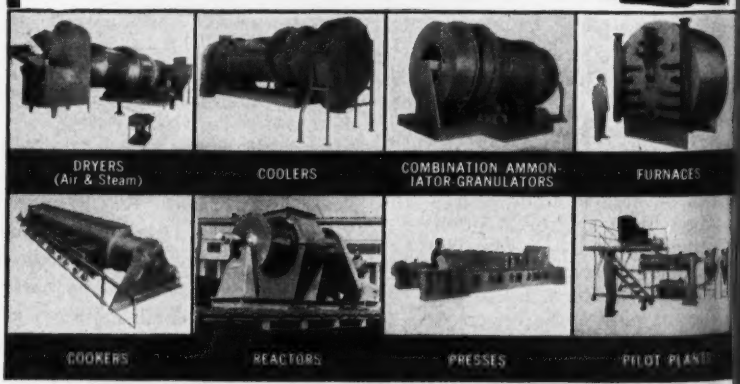

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Literature and information on request

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2639 BOSTON STREET, BALTIMORE 24, MD.

Check 1380 opposite last page

From page 183

ganic chemist, can easily follow the presentations.

After an introductory chapter comes a most excellent discussion of theory of the coordinate bond. Three sections on substitution reactions are conveniently divided into studies of octahedral complexes, square complexes, and the stereochemistry of octahedral complexes. Chapters on other types of reactions, notably isomerization, racemization, and oxidation-reduction, follow.

The many important catalytic effects of coordination compounds, particularly as found in biological systems, are divided into two types: acid-base and oxidation-reduction.

Book ends with some miscellaneous topics, such as absorption spectra of complex ions, ion pairs, acid-base properties of complex and exchange reactions.

Each chapter is nicely documented and contains a thorough bibliography. References through 1957 are included. The book is well-indexed, both as to author and subject.

To obtain "Mechanisms of Inorganic Reactions" remit $11.75 direct to John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, N. Y.

Check 1381 opposite last page.

Management for Engineers

Reviewed by
CONRAD BERENSON
American Cyanamid Company
Stamford, Connecticut

In this 453-page book, Prof. Roger C. Heimer introduces the business aspects of industry to engineers with little or no industrial experience. He directs attention to the profit motive while showing that decisions the engineer will frequently have to make are concerned with human beings and not with physical constants that can be fed to a computing machine.

Book very clearly acquaints the engineer with the day-by-

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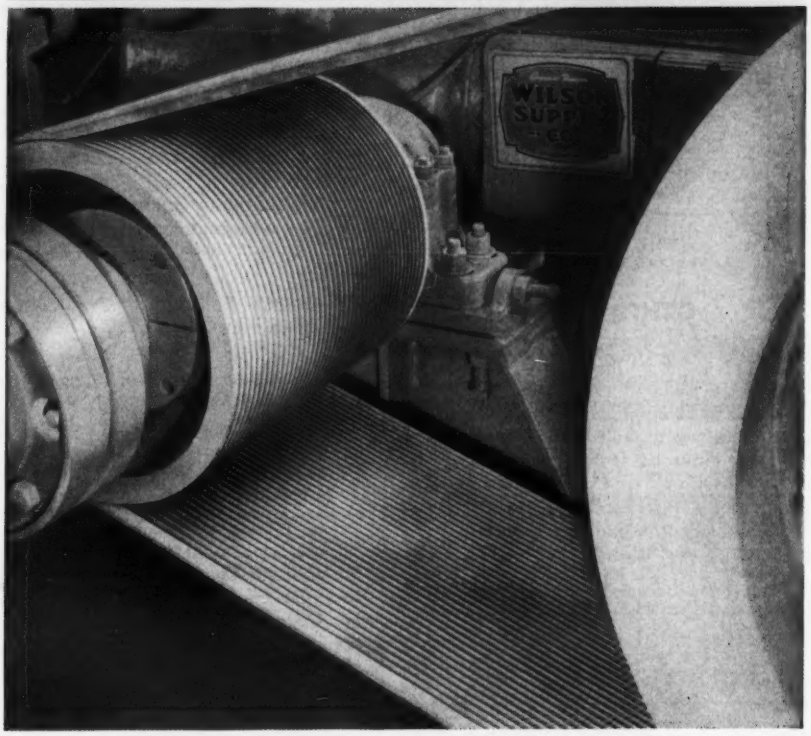
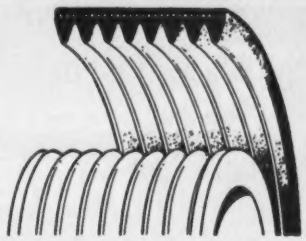
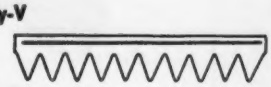




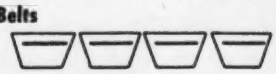
● ELIMINATES "MATCHING" PROBLEMS

A SINGLE UNIT across full width of sheave—NOT an assembly of SEVERAL V-BELTS

Poly-V



V-Belts



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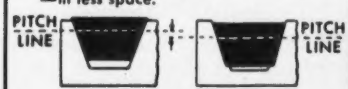

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Sheave grooves do not wear out of shape. Full and complete contact-pressure of rubber-to-sheave maintains groove profile. Maintains constant pitch and speed ratio.

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This gas compressor drive was rough on V-belts . . . until Wilson Supply Company installed trouble-proof R/M Poly-V Drives on all 200 HP units. Today, R/M's patented, space-saving transmission drive assures a degree of power-packed performance and dependability not possible with any available V-belt drive!

Major causes of V-drive trouble are engineered *out* of Poly-V Drive. It features a single unit, V-ribbed belt—*not* an assembly of V-belts that become unmatched and prevent complete power delivery. Full contact between Poly-V Belt ribs and specially designed sheave grooves keeps belt position constant . . . maintains groove shape and profile regardless of wear—with less wear on belt and sheaves even under toughest drive conditions! Speed ratio is unchanged. And because Poly-V Belt has uniform, uninterrupted strength member across the sheaves, Poly-V Drive will reliably deliver up to 50% *more* power in the same space as a multiple belt drive—or equal power in as little as ⅔ the space!

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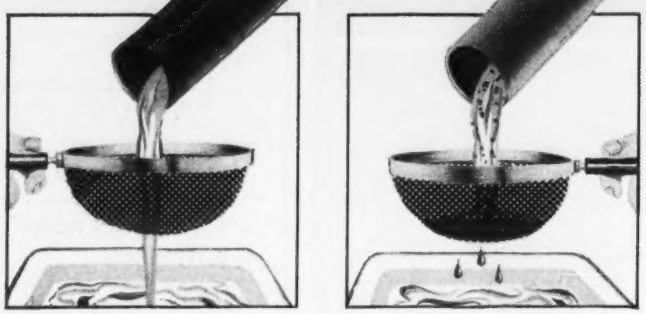
Check 1382 opposite last page

Fibercast® NON-CORROSIVE PIPE PREVENTS CONTAMINATION



FIBERCAST **OTHER PIPE**

How Fibercast Pipe is the answer to the dual control of contaminants is best explained through the above simple illustrations.

The smooth interior of Fibercast (Hazen-Williams C Factor-147) prevents the accumulation of contaminating globules, slime and sediment on the pipe's walls. And, since Fibercast is non-corrosive, it *does not* create a contaminant such as iron oxide and bacteria residue as is the case in many other piping systems. If the stream is non-contaminated when it enters a Fibercast line it is just as pure when it leaves!

Fibercast is the solution to your piping problems, whether they be contamination, corrosion, weight or many other factors. Get the complete Fibercast story. Send the coupon below for the newly-published Bulletin No. 20.

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Check 1383 opposite last page

RECENT BOOKS

day workings of a business enterprise. It 1) introduces the beginner to the flow of money, production costs, profits, and depreciation, 2) outlines financial and legal bases of industrial organizations, 3) indicates concepts controlling administration of authority and the functions of management, and 4) awakens the engineer to how he can aid in solving management's problems of an economic, social, and political nature.

Because of the wide scope of the book, most topics are treated rather succinctly. An exception to this is the chapter on depreciation, which covers the subject much more thoroughly than many texts on corporate finance. All engineers, even those of wide experience, will benefit from this especially fine section.

To obtain "Management for Engineers" remit $6.75 *direct to McGraw-Hill Book Co.,* 330 *W.* 42*nd St., N.Y.* 36, *N.Y.*

Gum Plastics

This book of 193 pages by M. Stafford Thompson, Naugatuck Chemical Div., U.S. Rubber Company, is the ninth of a series. Current volume emphasizes applications of impact polystyrene, ADS polymers, and impact PVC. It covers general properties, chemistry, and fabrication.

This is the first expensive treatment of rubber-modified plastic resins and their uses. Author describes their advantages in terms of product improvement, and shows how certain disadvantages of these materials can be overcome. Special attention has been given to new applications, new compounds, and a discussion of applications now in the development stage.

Well-illustrated volume is semi-technical in nature. It provides product designers, engineers, and fabricators with a good basic reference on gum plastics and their applications.

To obtain "Gum Plastics" remit $4.50 *direct to Reinhold Publishing Corp.,* 430 *Park Ave., New York* 22, *N.Y.*

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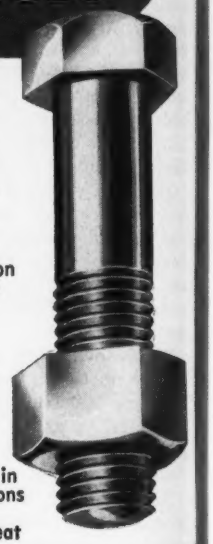

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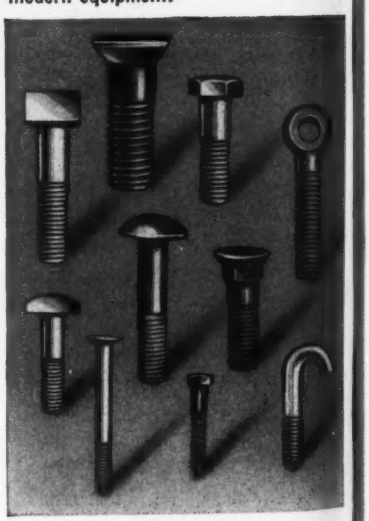

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THE PLACE TO SOLVE YOUR BOLT PROBLEMS
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"The Bolt Man"

Check 1384 opposite last page

new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheet, etc., are found throughout other sections of this magazine

Aluminum chelate's properties and characteristics are detailed in Aluminum Chelate Tech Data Sheet — The Harshaw Chemical Company, 1945 E. 97th St., Cleveland 6, Ohio.

Check 1385 opposite last page.

Dust and fume problems—cloth or glass bag dust collectors are discussed in 24-page, illustrated handbook. Difficult hot and corrosive applications are featured. Bul 562-D—Wheelabrator Corp., 1036 S. Byrkit St., Mishawaka, Indiana.

Check 1386 opposite last page.

Nuclear engineering—an advanced home-study course is outlined in 50-page book. A short review of the field and the future manpower needs are included. "Nuclear Home Study Course"—Crei Atomics, div. of Capitol Radio Engineering Institute, 3224 Sixteenth St., N.W., Washington 10, D.C.

Check 1387 opposite last page.

Pneumatic bulk trucks of aluminum for handling polystyrene pellets are discussed in Bul 205—Sprout, Waldron & Co., Inc., Muncy, Pa.

Check 1388 opposite last page.

Dry feeders for rate-controlled feeding of chemical reagents and dry bulk materials for water filtration, sewage disposal, etc., are specified in eight-page booklet, "Dry Feeder Machines" — Syntron Company, 110 Lexington Ave., Homer City, Pa.

Check 1389 opposite last page.

Self-priming pumps are outlined in catalog. Construction details and capacity charts for belt- and direct-drive for operating pressures up to 150 psi are included in Cat 58—Ertel Engineering Corporation, Kingston 3, N. Y.

Check 1390 opposite last page.

Safety on the job is discussed in 16-page pamphlet for which quantity prices are available. "Are You Safety Minded?" — National Safety Council, 425 North Michigan Avenue, Chicago 11, Ill.

Check 1391 opposite last page.

Material handling basic concepts are discussed in 16-page booklet revised from original published in 1952. Tells major objectives, costs, how to select equipment, how to suggest improvements to management. "The Basic Concepts of Industrial Material Handling" —Educational Div., The Material Handling Institute, Inc., One Gateway Center, Pittsburgh 22, Pennsylvania.

Check 1392 opposite last page.

Cast-alloy data is tabled in reference chart. Chart contains 55 widely used cast alloys in carbon, low-alloy, and stainless-steel groups, in addition to nickel and monel. Standard data are included along with design applications in Reference Chart — Lebanon Steel Foundry, 73 Lehman Street, Lebanon, Pa.

Check 1393 opposite last page.

Air filters are described in 8-page bulletin. Units have guaranteed efficiency of 99.97% on 0.3 micron particles. Bul 238 — Dept. PD, American Air Filter Company, 215 Central Ave., Louisville 8, Kentucky.

Check 1394 opposite last page.

Succinic anhydride properties and uses are outlined in 39-page brochure. Formulations and physiological properties are included. Bul I-11 — Publicity Department, National Aniline Div., Allied Chemical Co., 40 Rector St., New York 6, New York.

Check 1395 opposite last page.

Laboratory and scientific glassware line is shown in 88-page catalog. A total of 377 glass items ranging from adapters to stopcocks are illustrated. Cat 89A58 — Fischer & Porter Co., 835 Jacksonville Rd., Hatboro, Pa.

Check 1396 opposite last page.

Steel and aluminum data are contained in 256-page booklet which includes aluminum analyses, characteristics, mechanical properties, and tolerances, in addition to previously published steel information. "Ryerson Data Book, Steel and Aluminum" — Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill.

Check 1397 opposite last page.

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METALLIC MEDIUM
for FILTRATION STRAINING DISTRIBUTION DISPERSION

More Efficient
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Lasts Longer in

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- Filter Presses
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Strong—rigid—requires little support or reinforcement. Can be formed into panels, discs, plates, cylinders, cones. Not injured by scraping, flushing or blowback. Does not clog or blind. Made in stainless steel, Monel, aluminum, Carpenter 20 steel.

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Check 1400 opposite last page

NEW LITERATURE

Radioisotopes' use in yield determination is outlined in four-page bulletin. Application of radioisotopes to analytical problems is detailed, procedures are outlined, and questions on use of radioisotopes are answered. Tech Bul One — Nuclear-Chicago Corporation, 223 West Erie St., Chicago 10, Ill.

Check 1401 opposite last page.

Automatic temperature regulators which are self-powered and utilize no external power such as electricity or compressed air are reported in Bul 620—Sarco Company, Inc., 635 Madison Ave., New York 22, N. Y.

Check 1402 opposite last page.

Pelletizers are detailed in technical bulletins. Included are descriptions of models for cutting into strips and cross-cutting into pellets with various circular knife arrangements for different materials. Tech Buls 210, 213, and 217 —Taylor, Stiles & Co., 20 Bridge St., Riegelsville, N. J.

Check 1403 opposite last page.

Nickel-base alloys that are corrosion-resistant are described in booklets. "Hastelloy Alloy B" and "Hastelloy Alloy D" — Haynes Stellite Company, Division of Union Carbide Corporation, Kokomo, Ind.

Check 1404 opposite last page.

Oscillating conveyors are classified and explained in Book 2744 —Link-Belt Company, Prudential Plaza, Chicago 1, Ill.

Check 1405 opposite last page.

Drawer-type ovens for preheating and drying applications are discussed in literature sheet. Literature Sheet 201-2, Dept. KP, Despatch Oven Company, 619 SE 8th Street, Minneapolis, Minn.

Check 1406 opposite last page.

Rotary compressors are depicted in bulletin. Single-stage (800 to 12,500 cfm) and two-stage (2000 to 12,500 cfm) units are included in Bul ACO 100.1—Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

Check 1407 opposite last page.

Isotope Development Program — an AEC-industry effort to speed up use of and encourage production of radio-isotopes in U. S. is outlined in 8-page brochure. "Isotope Development Program" — U. S. Atomic Energy Commission, Washington 25, D. C.

PVC plasticizers' specifications, resin compatibility, and performance are outlined in eight-page booklet. Also included is information on stabilization, toxicity, and shipping of products. Tech Bul PL-630 — Organic Chemicals Division, Monsanto Chemical Company, PO Box 478, St. Louis 3, Missouri.

Check 1408 opposite last page.

Inventory counter to automatically record account of stock and amount used per batch, hour, shift, day, or week, of up to 24 ingredients, is described in two-page Product Data Sheet 5805 — Richardson Scale Co., Clifton, N. J.

Check 1409 opposite last page.

"This is the last policy I try to sell in this place!"

NEW LITERATURE

Heat-transfer systems of liquid-phase type are detailed in Bul 597—Parks-Cramer Company, Fitchburg 12, Mass.

Check 1410 opposite last page.

Stainless-steel tube technical data are detailed in eight-page folder. Bul TDC-190 — Tubular Products Division, The Babcox & Wilcox Company, Beaver Falls, Pa.

Check 1411 opposite last page.

Absorption and oxidation problems are discussed in Absorption and Oxidation Buls — Process Equipment Division, General American Transportation Corporation, 135 S. LaSalle St., Chicago 90, Ill.

Check 1412 opposite last page.

Metal-clad switchgear is set forth in 24-page bulletin which includes panel layouts and dimensions for standardized units. Bul 2804-1A — I-T-E Circuit Breaker Company, 1900 Hamilton Street, Philadelphia, Pennsylvania.

Check 1413 opposite last page.

Radiation-survey meters are covered in eight-page bulletin that gives detailed specifications, performance data, optional accessories, sizes, and weights. Form 3044B — Instruments Division, The Victoreen Instrument Company, 5806 Hough Avenue, Cleveland 3, Ohio.

Check 1414 opposite last page.

High-pressure gages are depicted in catalog. Complete line is included in High-pressure Gage Cat —Strahman Valves, Inc., 16 Hudson St., New York 13, N. Y.

Check 1415 opposite last page.

Liquid urethane prepolymer, including uses, properties, and viscosity characteristics are covered in 4-page bulletin. "Solithane 113" — Thiokol Chemical Corporation, 780 North Clinton Ave., Trenton 7, New Jersey.

Check 1416 opposite last page.

Laboratory-fire causes, fire-prevention recommendations, and case histories are included in 16-page bulletin available at $.50 per copy. Bul FR 58-3 — National Fire Protection Association, 60 Batterymarch Street, Boston 10, Mass.

Reagents and other chemicals' specifications and prices are cataloged in 224-page publication. "Specification Catalog and Price List 58"—J. T. Baker Chemical Co., Phillipsburg, N. J.

Check 1417 opposite last page.

These characteristics of
CAMBRIDGE METAL-MESH BELTS
give you fast, low-cost, uniform chemical processing
Whatever you process or package — slab, sheet, pelletized or powdered materials — Cambridge Metal-Mesh Belts combine movement with processing to give you greater production and consistently high quality without costly manual handling.
Open mesh construction allows heat, cold or liquids to flow through the belt and around the product for fast, thorough processing. Liquids drain off quickly, completely. Superior belt design and manufacturing techniques mean longer belt life, fewer repairs, lower operating costs. Smooth belt surface has no sharp edges; can be easily cleaned. Belts can be made heatproof, coldproof, acid proof — in any mesh, weave, metal or alloy — with any side or surface attachments.
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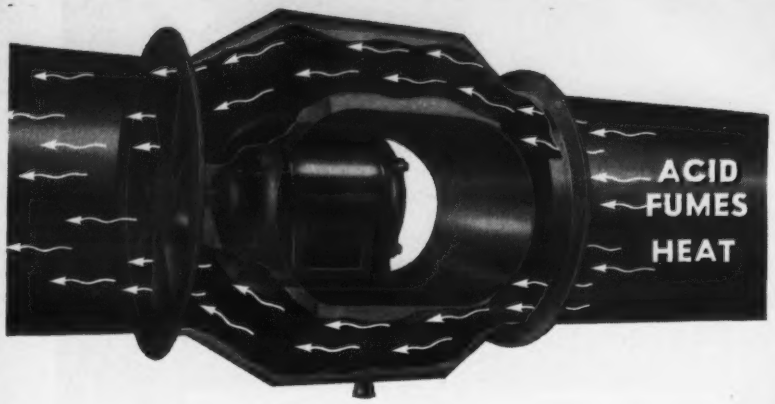

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Corrosive fumes and high temperature air never come in contact with a DeBOTHEZAT bifurcator motor.

That means less maintenance time and smoother operation month after month.

For acid atmospheres, DeBOTHEZAT bifurcators offer motor housings of acid-resistant metal alloys or with PVC (plasticized polyvinyl chloride) linings. Fan wheels can also be furnished in acid-resistant metal alloys, hot-dipped PVC or other corrosion-resistant coatings.

Smooth-line exhaust flow eliminates wasteful, sharp-corner deflection. There's less air friction for greater velocity.

The most *efficient* plant ventilating systems include DeBOTHEZAT bifurcators. Get the full story from a DeBOTHEZAT engineer NOW.

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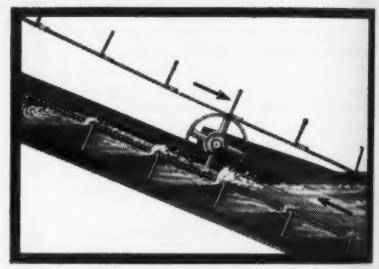
Check 1419 opposite last page

WASH WATER goes UP . . .

slimes cannot remix with sands

. . . in the "OVERDRAIN" Classifier

The "Overdrain" Classifier is a completely new device in the field of mechanical wet classifiers. The belt, with lifting flights attached beneath, moves upwardly out of the sand bed between two stationary side shrouds—creating the effect of a series of moving, closed, washing compartments.



Section through "Overdrain" Classifier showing upward-moving, closed, washing compartments.

The only outlet from these compartments is via holes in the belt above. Surplus liquid and slimes discharge through these "overdrain" holes without mixing with the oncoming sands. The end result is an extremely clean sand discharge, excellent de-sliming—making the "Overdrain" Classifier an ideal washing device.

Acid-proof construction available.

Write for
Hardinge Catalog 39-C-13

Unretouched photograph of "Overdrain" action above the belt—water and slimes discharging upwardly.

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Check 1420 opposite last page

NEW LITERATURE

How to organize management to obtain the best results is subject of 22-page booklet. "Results Approach to Management" may be obtained by submitting $1.50 direct to Research Division, Society for Advancement of Management, 74 Fifth Ave., New York 11, N.Y.

Ductile irons are detailed in 28-page booklet including tables and graphs covering physical and chemical properties and applications. "Engineering Properties of Ni-Resistant Ductile Irons" — The International Nickel Co., Inc., 67 Wall Street, New York 5, N. Y.

Check 1421 opposite last page.

Atom-model line is described and illustrated in color in revised eight-page brochure. Listed for first time is a cyclopropane-group carbon-atom model and a walnut storage cabinet with five recessed polystyrene trays that hold at least 195 atom models. Bul 10a58 — Arthur S. LaPine and Company, 6001 South Knox Ave., Chicago 29, Ill.

Check 1422 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Tractor and grader special equipment is listed in 12-page Cat MS-1189 — Construction Machinery Division, Allis-Chalmers Manufacturing Company, Milwaukee 1, Wisconsin.

Check 1423 opposite last page.

Aldehydes, including several recently introduced products, are discussed in 38-page revised catalog. Handy tables list specifications, test methods, shipping data, and physiological properties. Fifteen charts are devoted to physical properties. "Aldehydes" — Union Carbide Chemicals Co., Union Carbide Corporation, 30 East 42nd St., New York 17, N.Y.

Check 1424 opposite last page.

Variable-speed drives are covered in Book 2274—Link-Belt Company, Prudential Plaza, Chicago 1, Illinois.

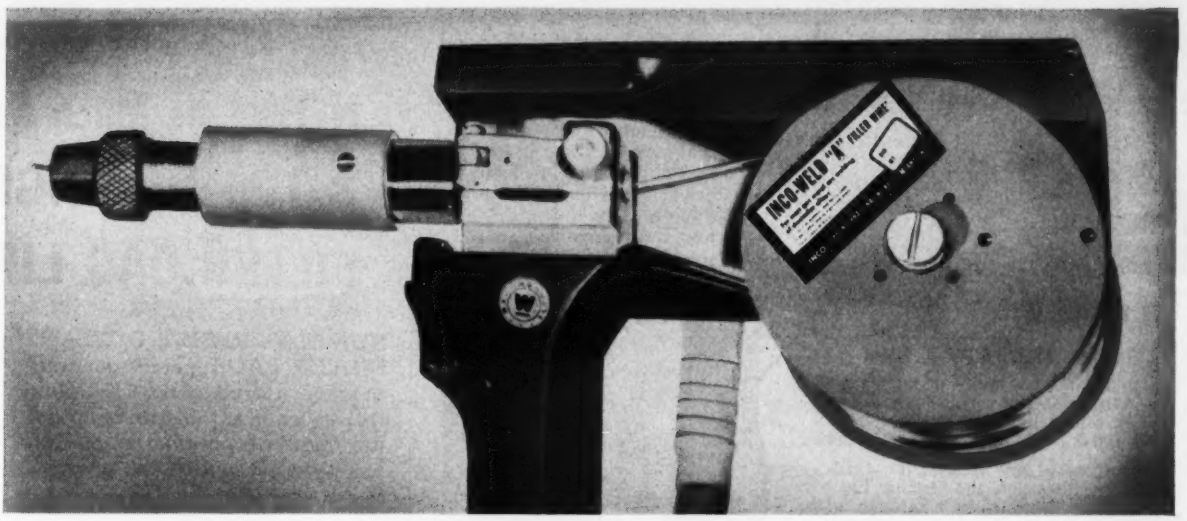
Check 1425 opposite last page.

Materials handling equipment line, including barrel and platform trucks, trailers, carts, skids, and wheels, in cataloged in four-page Data Sheet 50 — SI Handling Systems, PO Box 70, Easton, Pa.

Check 1426 opposite last page.

"67" 70/30 COPPER-NICKEL FILLER WIRE
INCO-WELD "A" FILLER WIRE
"60" MONEL FILLER WIRE
"61" NICKEL FILLER WIRE
"62" INCONEL FILLER WIRE

Now! Take your pick of filler wires



on Inco's new 2 pound MIG spools

New from Inco, 2 pound MIG spools of:

- Inco-Weld* "A" Filler Wire
- "67"* 70/30 Copper-Nickel Filler Wire
- "62" Inconel* Filler Wire
- "61"* Nickel Filler Wire
- "60" Monel* Filler Wire

Now you can weld most dissimilar alloy combinations, most Inco Nickel Alloys even quicker, even easier. And still get the same sound and strong, corrosion-resisting welds.

Those short-length welds in hard-to-get-at places no longer have to be troublesome. Just load your welding gun with one of these little spools, and you're ready to weld . . . anywhere.

They're another example of how Inco keeps up with your needs, keeps you better equipped to weld better, faster, and easier.

Why not order some of these new spools today from your local distributor? Just look in the classified under "Nickel".

*Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street — New York 5, N. Y.

INCO

INCO WELDING PRODUCTS

electrodes • wires • fluxes

Check 1427 opposite last page

For SPEED, SIZE, SAVINGS and SAFETY

FLETCHER SUPER CENTRIFUGALS

SOLVE YOUR PROBLEMS

Call on Fletcher to solve your toughest problems in centrifugal engineering.

For example, this super-suspended centrifugal—the Fletcher Super-S-Omatic broke through the speed barrier. Until it was developed, no centrifugal of this size existed that achieved 1600 RPM = 1750 G's.

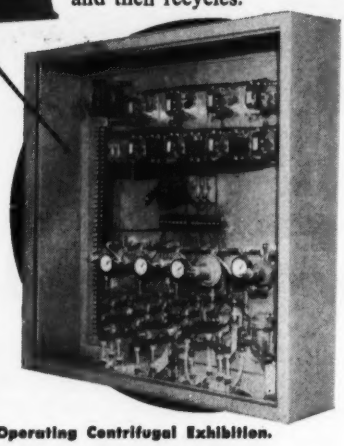
This Fletcher centrifugal, with a gravity of 1750 G's, is coupled with a production rate of 16 cubic feet per batch. This unit is capable of 6 production cycles per hour.

The Fletcher Super-S-Omatic features infinite variable speed by fluid mechanical drive. It's *completely* automatic—at the touch of a button it automatically starts, feeds, skims, brakes, unloads and then recycles.

FLETCHER ELECTRO-NUMATIC BRAIN

Eliminates all possibility of human error. Assures perfect performance. Completely safety interlocked. Cuts labor costs 100%.

Regardless of how intricate the schedule of centrifugation, the Fletcher Electro-Numatic Brain thinks it through *all the way.*



FLETCHER PILOT PLANT CENTRIFUGAL

Rugged, compact machine combines functions of extractor, separator and clarifier. Results from this test unit can be accurately scaled up to production unit.

WHEN in Philadelphia Visit The Fletcher Operating Centrifugal Exhibition.

ASK ABOUT THE FLETCHER RENTAL PLAN

The New Fletcher Works, Inc. CENTRIFUGAL DIVISION

201 Glenwood Avenue • Philadelphia 40, Pa.

Send me additional information on the Fletcher Centrifugals.

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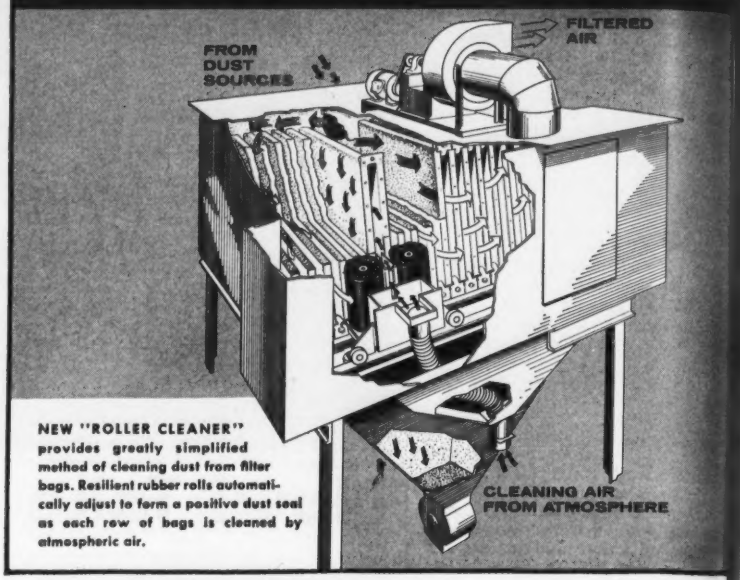
Check 1428 opposite last page

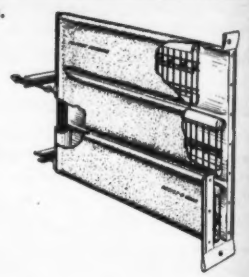
NEW *SLY* DYNACLONE® DUST FILTER



NEW "ROLLER CLEANER" provides greatly simplified method of cleaning dust from filter bags. Resilient rubber rolls automatically adjust to form a positive dust seal as each row of bags is cleaned by atmospheric air.

Patent Nos. 2583039, 2695681, 2867289. Other Patents Pending.

NOW! As Much As 3 TIMES LONGER FILTER BAG LIFE



NEW SLY "RESIST-O-WEAR" FILTER BAGS (patent pending) provide complete dust filtration with as much as three times longer life than conventional bags. This has been proved on the toughest field installations.

The new bag has three equal-size sections. Each pocket has two spacers, making a total of six per bag. Weight is distributed on three seams rather than one, minimizing strain. A special protective flap on the back end prevents abrasion from incoming dust.

Now standard in the new "Roll-Clean" Dynaclone, Sly "Resist-O-Wear" bags combine with all the other superior Dynaclone features to assure greatest dust collecting efficiency with unequalled maintenance-free service.

ALL THESE FEATURES IN ONE DUST FILTER

- New "Resist-O-Wear" bags last as much as three times longer.
- Constant suction at dust sources—complete dust collection.
- Automatically self-cleaning for continuous operation.
- Free-rolling cleaner. Complete dust seal—automatic seal adjustment.
- Greater filtering capacity; smaller space requirements.
- Simplified construction for ease of inspection and servicing.

SEND FOR New Bulletin 105 and New 36-page Dust Control Catalog 104.

SINCE 1879 SLY

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OFFICES IN PRINCIPAL CITIES
OVERSEAS LICENSEE: ANDREW AIR CONDITIONING LTD., LONDON S. W. 1, ENGLAND

Check 1429 opposite last page

NEW LITERATURE

Force-measurement techniques are analyzed and compared in 16-page booklet that discusses electronic force measurement, strain gages, system inaccuracies, and integrated force systems. "Modern Force Measurement, No. 1-Principles" — Electronics & Instrumentation Division, Baldwin-Lima-Hamilton Corporation, Waltham 54, Mass.

Check 1430 opposite last page.

Organic chemicals, including fatty acid esters, are cataloged in four-page brochure. Product designations, descriptions, and specifications are listed. "Specifications and Characteristics of Organic Chemicals" — Dept. 5, Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio.

Check 1431 opposite last page.

Cobalt is discussed in new five-page data sheet, one of more than 20 CIC publications on cobalt now available. Literature may be obtained by writing on company letterhead directly to the Cobalt Information Center, c/o Battelle Memorial Institute, 505 King Avenue, Columbus 1, Ohio.

Extraction columns of liquid-liquid type are outlined in RDC Extraction Column Bul — Process Equipment Division, General American Transportation Corporation, 135 S. LaSalle St., Chicago 90, Ill.

Check 1432 opposite last page.

Low-temperature valves for handling cryogenics are subject of two-page brochure. Operating characteristics and specifications are discussed in detail. Data sheet 100 — Sales Promotion Dept., Koehler Aircraft Products Company, Subsidiary of New Britain Machine Co., 409 Leo Street, Dayton, Ohio.

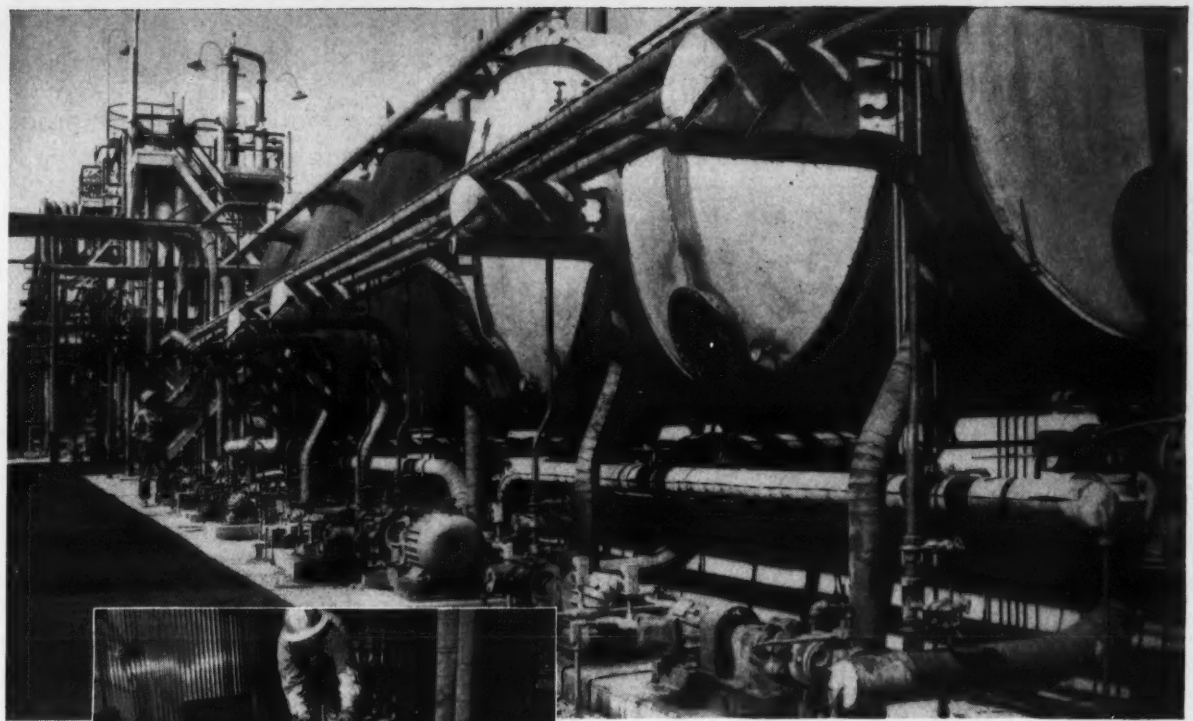
Check 1433 opposite last page.

Fireproof coating for decks, ceilings, beams, girders, and columns is described in four-page bulletin. Included are technical data concerning specifications, UL fire-retardant ratings, application data, and job-in-process illustrations. Bul F-10—Columbia Acoustics and Fireproofing Company, Stanhope, N.J.

Check 1434 opposite last page.

Pressure switch for controlling liquid or gas pressures up to 3000 psi is described in two-page specification sheet. Included is a diagrammatic sketch. Specification Sheet S1011-3—Industrial Division, Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44, Pa.

Check 1435 opposite last page.



La Bour Pumps Make Good on Another Kind of Tough Job

Most of the tasks assigned to La Bour Pumps involve corrosive liquids, suction conditions aggravated by vapors or gases, or solid particles such as crystals or dirt. Sometimes all three appear in one application. But here's a job with none of these problems, yet it took the unique design and capabilities of La Bour to provide a satisfactory solution.

There are 32 La Bour Type DZT pumps now at work at Bareco Wax Company, Barnsdall, Okla., and 12 others are in process of installation there. They move wax, at temperatures above 200° F., through all stages of manufacture. Pumps and lines are steam-jacketed throughout.

Whatever your problem in handling process liquids, corrosive or otherwise, it will pay you to get in touch with La Bour.

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

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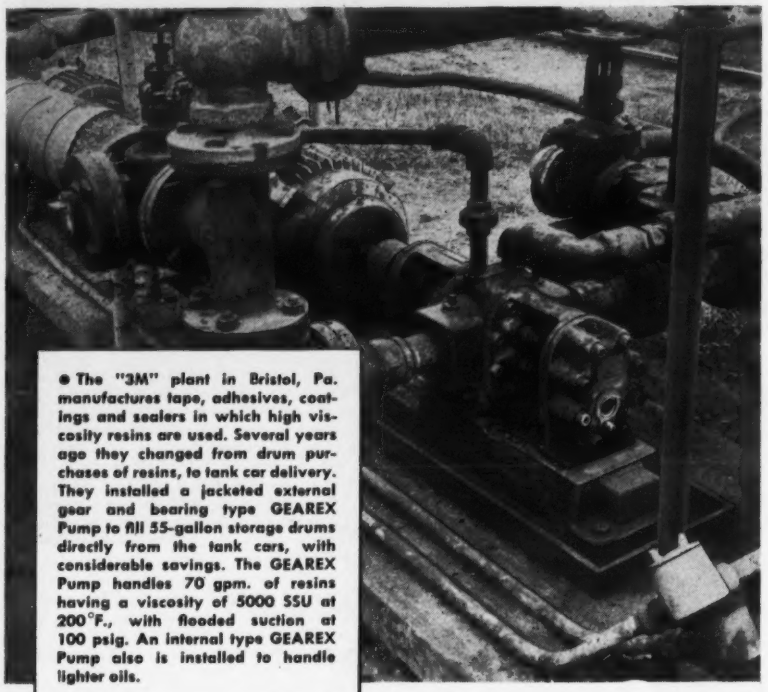
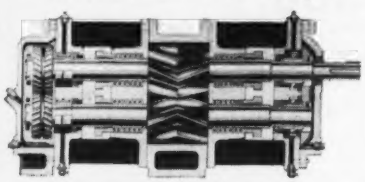
Sier-Bath GEAREX® PUMPS

help cut costs for MINNESOTA MINING & MFG. CO. in tank car-to-drum pumping of heavy resins

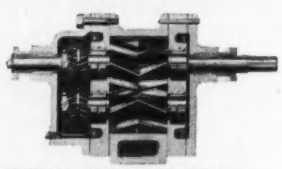


● The "3M" plant in Bristol, Pa. manufactures tape, adhesives, coatings and sealers in which high viscosity resins are used. Several years ago they changed from drum purchases of resins, to tank car delivery. They installed a jacketed external gear and bearing type GEAREX Pump to fill 55-gallon storage drums directly from the tank cars, with considerable savings. The GEAREX Pump handles 70 gpm. of resins having a viscosity of 5000 SSU at 200°F., with flooded suction at 100 psig. An internal type GEAREX Pump also is installed to handle lighter oils.

***Sier-Bath* "Gearex" Pumps**



EXTERNAL GEAR & BEARING TYPE
for non-lubricating liquids



INTERNAL GEAR & BEARING TYPE
for lubricating liquids

Sier-Bath "Gearex" Pumps provide positive displacement, pulseless flow . . . quiet, vibrationless operation. Direct-connected up to 1800 RPM, they require no reduction gears. For high volumetric efficiency and long life there is no rotor-to-rotor or rotor-to-casing contact. Low pressure on stuffing boxes provides easy servicing.

Horizontal or vertical models to handle 32 to 500,000 SSU, 1 to 550 GPM at 250 PSI for viscous liquids, 50 PSI for water. Corrosion-resistant alloys, steam-jacketed bodies, water-cooled bearings, other adaptations to meet individual needs. See "Yellow Pages" for your local Sier-Bath Pump Representative or send for Bulletin G-2. *Sier-Bath Gear & Pump Co., Inc.,9260 Hudson Blvd., North Bergen, N. J.*

Sier-Bath ROTARY PUMPS

Screw Pumps **Gearex® Pumps** **Hydrex® Pumps**

Founded 1905 **Mfrs. of Precision Gears, Rotary Pumps, Flexible Gear Couplings** **Member A.G.M.A.**

Check 1437 opposite last page

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the know-how
the equipment
and the experience
for solving problems involving fluids

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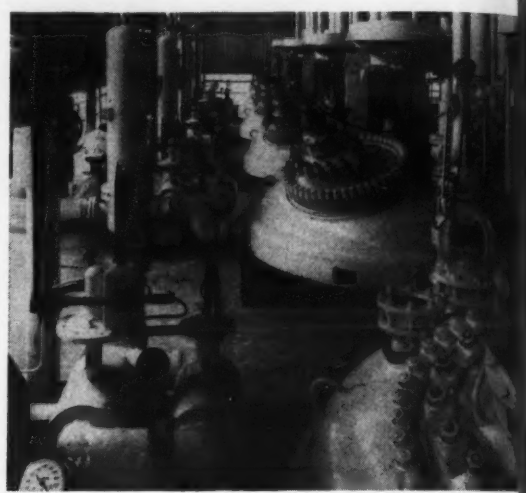

FLUIDICS AT WORK

Three ways to test the value of Glasteel polymerizers

Purer polymers. The glass used in Pfaudler Glasteel polymerizers cannot contaminate the materials you use to make synthetic resins. Nor can it discolor those materials. Nor can it act as a catalyst with them to set off undesired side reactions. These facts are being proved every day by the hundreds of Glasteel vessels being used for polymerization.

Naturally, you also get the bonus of Glasteel's unsurpassed acid-alkali corrosion resistance, so you can expect equipment to last longer.

Less downtime between batches. The glass used in Glasteel is smoother than the most highly polished of metal surfaces. Even the stickiest polymers find it difficult to cling. What little does stick washes away quickly between batches. So, you can expect to put through more product per day with a Glasteel polymerizer.

Lower cost. Glasteel actually costs less . . . significantly less . . . than the alloys which you might turn to in order to protect your product's purity. A few minutes' discussion with one of our representatives will show the magnitude of the savings you could make with Glasteel construction.

Details: Design pressures: 150 or 200 psi. 2000- and 3700-gallon sizes standard; other sizes on special order. Removable blade agitator. Non-metallic, dual rotary seal between agitator and top head to prevent lubricant contamination. Temperature of product and jacket contents controlled to ± 1.0°F. Write for Bulletin 932 for complete specs.

New Glasteel spray rinse valve. Eliminate manual clean-out and opening of manholes between batches with this new valve which also gives you the full protection of Glasteel construction. Data Sheet 38 gives the details.

Glassed piping too. Protect purity of raw materials and additives plus your payload with glassed piping. Convenient lengths in diameters of 1½" through 12" O.D. Glassed valves and fittings, too, of conventional type and sizes. Bulletin No. 886 gives specifications. Write to our Pfaudler Division, Dept. CP-49, Rochester 3, N. Y.

PFAUDLER PERMUTIT INC.

Specialists in FLUIDICS . . . the science of fluid processes

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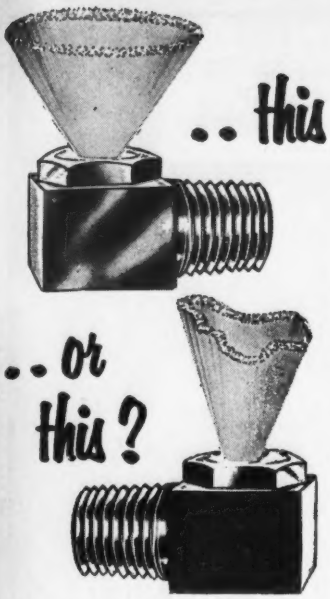
Check 1438 opposite last page



BE SURE OF A PERFECT CONICAL SHAPE SPRAY ALL THE TIME WITH *Monarch*

For a perfect spray, many plants prefer Monarch nozzles.

These advance design nozzles reduce clogging and guarantee dependable applications to . . .

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Check 1439 opposite last page

NEW LITERATURE

Spectroscopic graphite products are detailed in 20-page catalog. Loose-leaf binding provides for information to be added to all sections as developments occur. Catalog can accommodate three-ring note paper for recording purposes. Physical properties of spectroscopic graphite rods are described. Cat S-58 — United Carbon Products Company, PO Box 747, Bay City, Mich.

Check 1440 opposite last page.

Roller mills including one, two, three-pair high, and double roller mills are described in 4-page bulletin. Specifications, and discussion of one-point control are covered. Bul 153-A — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pennsylvania.

Check 1441 opposite last page.

Belt conveyors — Four-page bulletin contains engineering data on how to estimate conveyor requirements. Includes capacity charts, recommended belt speeds, power requirements. WM Conveyor Bul — Western Machinery Company, 650 Fifth St., San Francisco 7, California.

Check 1442 opposite last page.

Plastic and elastomer technological problems facing military scientists are listed in booklet. "Inventions Wanted"—National Inventors Council, U. S. Department of Commerce, Washington 25, D. C.

Urethane technology is covered in brochure containing research material and calculations that will serve as reference matter. Urethane Research Note—National Aniline Division, NA46, Allied Chemical Corporation, 40 Rector St., New York 6, N. Y.

Check 1443 opposite last page.

"Having trouble with that equation, Professor?"

KEEP YOUR POWDER DESERT-DRY WITH LECTRODRYER

When you're processing powdered or granular hygroscopic materials, Lectrodryer is the solution to air moisture problems. These machines dry air to dewpoints as low as —110°F. You can choose automatic or manually controlled units, for continuous or intermittent operation. Tell us about your drying problem — we'll advise you how Lectrodryer custom-engineered or standard units can help you. *Write Pittsburgh Lectrodryer Division, McGraw-Edison Company, 352 32nd Street, Pittsburgh 30, Pennsylvania.*

Check 1444 opposite last page

DAY

Pneumatic Conveying & Bulk Storage News

FROM *Feathers* TO STEEL CHIPS

no job is too delicate or too tough
for DAY Air-line Conveying Systems

DAY *air-line* pneumatic conveying systems can handle hundreds of different products, efficiently and economically. That's why you find DAY equipment in a bedding plant conveying feathers . . . and in a machine shop moving steel chips. These totally different DAY air-line systems demonstrate the versatility and ability of DAY equipment to best serve your pneumatic conveying needs.

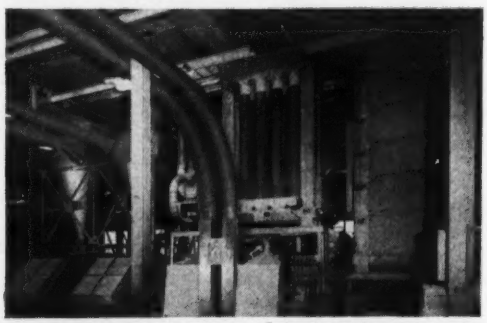
Only DAY gives you all types of equipment and services

DAY not only provides high density (so called "fluidizing") systems and low density conveying systems but also can supply all types of accessory equipment including the finest bulk storage tanks. This undivided responsibility is your guarantee of efficient, proven, dependable equipment that's right for your plant!

Vertical Bulk Storage Tanks

Horizontal Bulk Storage Tanks

Photo (below) shows DAY air-line pneumatic system which combines product drying and cooling with conveying. This system has been in successful operation for over 6 years.



Because no one type of conveying system fits all jobs it will pay you to study DAY BULLETIN M-588. It tells how to improve plant efficiency 6 ways and make substantial savings 9 ways with modern DAY *air-line* conveying systems. Write toDAY for free copy — BULLETIN M-588.

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EQUIPMENT ONLY OR A COMPLETE SYSTEM

Check 1445 opposite last page

NEW LITERATURE

Oscillating-screen centrifuges are depicted in bulletin. Size range is 5 to 50 tons per hour, recovering 98 to 99% of solids input. Oscillating-screen Centrifuge Bul—Bird Machine Company, South Walpole, Mass.

Check 1446 opposite last page.

Germanium and germanium dioxide physical characteristics are detailed in technical bulletin. Included are minimum-resistivity specifications of electronic-grade germanium and finished-product data. Germanium Tech Bul — Sylvania Electric Products, Inc., Towanda, Pa.

Check 1447 opposite last page.

Bucket elevators, either belt or chain mounted, are described in two-page Bul 958-5M-A — The Bucket Elevator Co., 360 Springfield Avenue, Summit, N. J.

Check 1448 opposite last page.

Propeller mixers of side-entering type are cataloged in Side-entering Propeller Mixer Bul — Process Equipment Division, General American Transportation Corporation, 135 S. LaSalle St., Chicago 90, Ill.

Check 1449 opposite last page.

Dial-thermometer line is covered in 12-page catalog including specifications and data tables. Cat 205 — United States Gauge Division, American Machine and Metals, Inc., Sellersville, Pa.

Check 1450 opposite last page.

Air-driven-motor line is listed with complete specifications in 16-page bulletin which includes case history examples. Form 5072A — Ingersoll-Rand Co., 11 Broadway, New York 4, N.Y.

Check 1451 opposite last page.

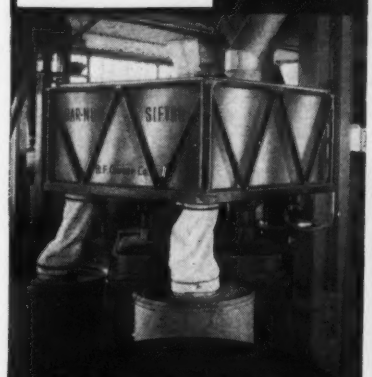
Rotary vacuum dryers are described in 4-page catalog. Capacities, heating surface areas, dimensions and weights are listed. Bul 610—Vacuum Equipment Div., F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.

Check 1452 opposite last page.

Plastics and adhesives are detailed in 113-page book. General properties and applications of all common plastics are listed; physical properties and engineering data are enumerated for a number of representative plastics. Adhesives are discussed from both theoretical and practical viewpoints in publication which is available at $2.50 per copy. Report PB 131686 — Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C.

do you screen or size dry chemicals?

laboratory pilot plant production



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Do you need to grade a material by particle size . . . screen out oversize and undersize particles . . . remove lumps or foreign materials . . . or make any type of particle-size separation? Then you want these Bar-Nun Rotary Sifter advantages:

- Accurate separations in large volume, produced in limited floor space.
- Screens totally enclosed by dust-tight, all-metal box. Optional stainless steel construction.
- Easy cleaning. Flip-action clamps permit quick opening of box, and easy removal of screens for thorough cleaning.
- Smooth, low cost operation. Exclusive, all-mechanical design and rugged construction give trouble-free performance even in continuous service on "hard-to-sift" materials.

For single or multiple separations, as fine as 325 mesh—in laboratory work or big volume, heavy duty production—you'll get bonus performance from a Bar-Nun Rotary Sifter. Users' repeat orders prove it. Write for specific details and recommendations without obligation.

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For details on other Gump processing equipment, refer to your copy of Chemical Engineering Catalog.

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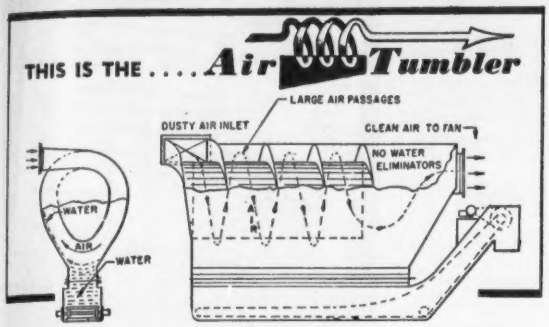
The MASTER of DUST in INDUSTRY



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Check 1455 opposite last page

NEW LITERATURE

Latex-resin-emulsion chemicals are discussed in eight-page bulletin. "Chemical for Resin Emulsions" — Union Carbide Chemicals Company Division, Union Carbide Corporation, 30 East 42nd Street, New York 17, N.Y.

Check 1456 opopsite last page.

Welding electrodes of manual-arc type are described and applications explained in 20-page catalog which includes electrode selection and identification charts. Bul 7000.2 — The Lincoln Electric Company, Cleveland 17, Ohio.

Check 1457 opposite last page.

Pilot plant for conducting research and development on processes for gases, liquids, and catalysts is described in 6-page catalog. Plant is designed to permit catalytic studies under conditions varying from ambient to 3500 psi and up to 2000° F. "Pilot Plant Facility" — Armour Research Foundation of Illinois Institute of Technology, Technology Center, 10 West 35th St., Chicago 16, Illinois.

Check 1458 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Digital voltmeters are described in bulletin containing detailed information on operation, circuiting, specifications, applications, accessories available. Bul 3018 — Beckman/Systems Div., 325 N. Muller Ave., Anaheim, Calif.

Check 1459 opposite last page.

Bottling calculator, indicating ratio of bottle pressure to liquid temperature to gas volume may be obtained by letterhead request to Terris Div., Consolidated Siphon Supply Co., Inc., 22 Wooster St., New York 13, N. Y.

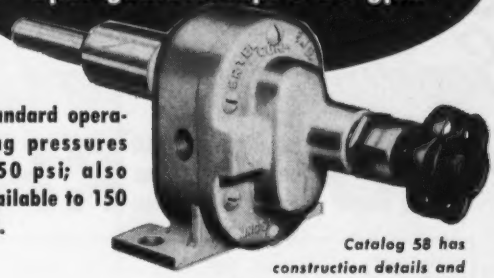
Rotary-shaft seals are subject of four-page bulletin. "Borg-Warner Precision Mechanical Seals" — Borg-Warner Mechanical Seals Division, Borg-Warner Corporation, PO Box 2017, Terminal Annex, Los Angeles 54, Calif.

Check 1460 opposite last page.

Ceramic and plastic foams for use in electrical and other applications are discussed in 20-page booklet. Physical and electrical properties are presented. "Eccobond Plastic Foams and Ceramic Foams" — Emerson & Cuming, Inc., 869 Washington St., Canton, Mass.

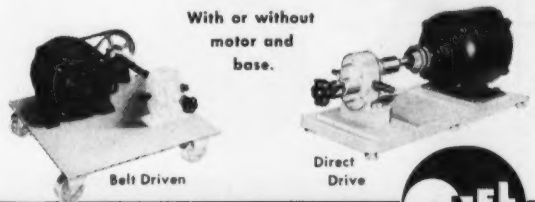
Check 1461 opposite last page.

ERTEL Stainless Steel Self Priming PUMPS have Plastic Spur gears...cap. 3-50 gpm



Standard operating pressures 3-50 psi; also available to 150 psi.

Catalog 58 has construction details and capacity charts. Write for it today.



ERTEL ERTEL Since 1932

ERTEL ENGINEERING CORPORATION
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KINGSTON 3 NEW YORK

Check 1462 opposite last page

VIBROLATOR®

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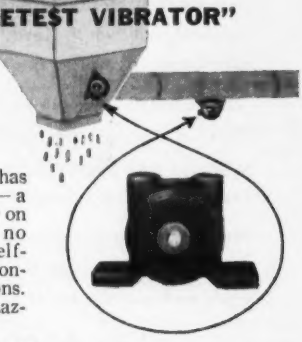
"WORLD'S QUIETEST VIBRATOR"

MOVES, SIFTS, COMPACTS MATERIALS



This vibration inducer has only one moving part — a rolling ball. Works perfectly on wet or dirty air. Needs no lubricator. Guaranteed self-starting always. Operates continuously in very hot locations. Absolutely spark-free for hazardous jobs.

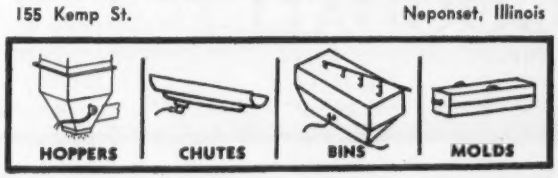
The Vibrolator* vibrator moves material out of hoppers, down chutes and through screens. Compacts concrete in forms or granulars in boxes or drums.

Available in 16 sizes. Prices begin at $16.00. Pocket watch size to the most powerful portable vibrator made. Will not harm equipment. *Write for catalog today.*

*VIBROLATOR IS A REGISTERED TRADE MARK

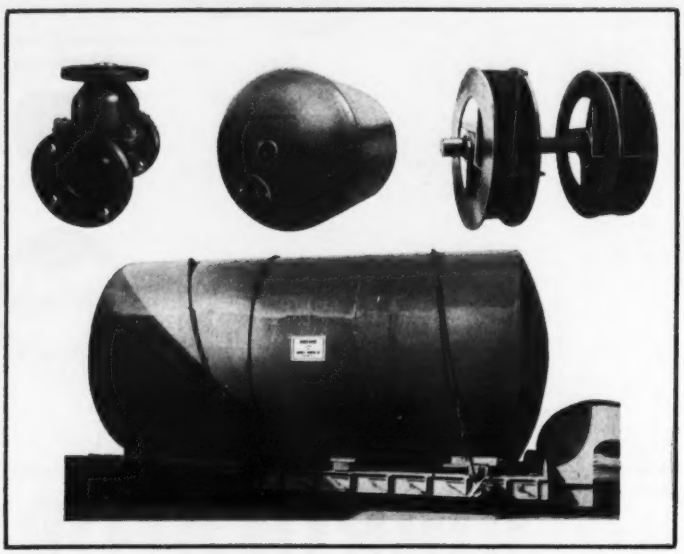
MARTIN ENGINEERING COMPANY

155 Kemp St. Neponset, Illinois



Check 1463 opposite last page

IF CORROSION IS A PROBLEM, *Talk With Goodall Engineers About* "RUBBERHIDE"



The success of "Rubberhide" Linings in providing effective, long-lasting protection against corrosion lies in the engineering experience and technical skill which Goodall is equipped to apply in producing compounds of rubber and neoprene to meet specific problems.

"RUBBERHIDE" Linings are processed to objects shipped to our Linings Plants in Trenton, Chicago or Houston; or, when the objects are too large for such shipment, or the work involves fixed plant equipment, experienced field crews do the processing "on location".

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See Pages 348-349, Chemical Engineering Catalog

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GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.

BRANCHES AND DISTRIBUTORS THROUGHOUT THE UNITED STATES. IN CANADA: GOODALL RUBBER CO. OF CANADA LTD., TORONTO.

Check 1464 opposite last page

NEW LITERATURE

Low-static styrenes and their properties are summarized in 8-page illustrated brochure. Typical molding formulations are included. Lustrex Lo-Stat bul — Department SL, Monsanto Chemical Company, Springfield, Mass.

Check 1465 opposite last page.

Acid-resistant uniforms are cataloged in four-page folder. Acid-resistant Uniform Cat — Angelica Uniform Co., 1427 Olive St., St. Louis, Mo.

Check 1466 opposite last page.

Soviet research papers covering fields of ceramics and glass have been translated into English. Table of contents listing these 63 documents are available without charge. Table of contents, Soviet Research in Glass and Ceramics—Consultants Bureau, Inc., 227 W. 17th St., New York 11, N.Y.

Check 1467 opposite last page.

Bulk-handling bins used in conjunction with automatic filling and discharge stations are featured in 20-page booklet. Cat 7 — Tote System, Inc., Beatrice, Neb.

Check 1468 opposite last page.

Vertical pressure filters for wet or dry cake discharge are outlined in 12 pages. Information on filter leaves, leaf nozzles and other auxiliary equipment is included. Bul EF/2 — The Duriron Company, Inc., Enzinger Division, Box 1019, Dayton 1, Ohio.

Check 1469 opposite last page.

Process controller for wide application is reviewed in bulletin. Line includes brass or stainless-steel bellows for low-pressure service, and brass, steel, or stainless-steel tubes for 25- to 10,000-psi range. Bul D4150-A—Fisher Governor Company, Marshalltown, Iowa.

Check 1470 opposite last page.

Thickeners are subject of 8-page illustrated brochure. Lifting devices and special rake arms for use in thixothropic slimes and other slurries are also discussed. Bul SM-1004 — Process Engineers, Inc., division of The Eimco Corporation, 420 Peninsular Ave., San Mateo, Calif.

Check 1471 opposite last page.

Can sorters and uncasers using magnetic principle are detailed in eight-page brochure. "Atkron Dumore Automatic Can Sorters and Uncasers"—Economic Machinery Co., Division of Geo. J. Meyer Manufacturing Co., 60 Fremont St., Worcester 3, Mass.

Check 1472 opposite last page.

Whirlex Forced Draft heavy duty fans are designed for service in all types of boiler and industrial applications. Special design airfoil impellers provide maximum static efficiency. All-welded housing construction allows for a dust-proof, leak-proof operation.

Whirlex Induced Draft heavy duty fans are available with either straight or evase type self supporting stacks. Special shaft cooling sleeves allow for the efficient use of air cooled bearings. Water cooled bearings can be furnished if desired.

Write for complete information on these and other types of Whirlex industrial fans.

Fly Ash Arrestor Corp.
200 N. 1st Street
BIRMINGHAM, ALA.

WHIRLEX

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first

ZIRCONIUM PUMPS

ECO "GEARCHEM" NOW MASS-PRODUCED FROM FORMER RARE ALLOY

COMMERCIALLY PRICED FOR

STANDARD PROCESS SERVICE REQUIRING RESISTANCE TO HOT CORROSIVES SUCH AS

HCl at 300°F

No contamination of acid with metallic salts through progressive dissolution, as with other metals. Wear-compensated, chemically-inert Teflon Gears. Grease-sealed stuffing box—Leak-proof against pressure or vacuum in open or closed loop systems. Write for details.

ECO ENGINEERING COMPANY
12 New York Ave., Newark, N. J.

Check 1474 opposite last page

NEW LITERATURE

Jacketed valves of stainless steel are described and illustrated in bulletin which includes sectional views. Bul 3 — Alloy Steel Products Company, Inc., Linden, N.J.

Check 1475 opposite last page.

Side-drive agitators are subject of 6-page bulletin. Design features, drawings, and performance data are given on belt-, gear-, and direct motor-driven side-drive models. Bul 582 — New England Tank & Tower Co., 87 Tileston St., Everett 49, Mass.

Check 1476 opposite last page.

Solid polyurethane applications are discussed in eight-page booklet based on paper presented at 1958 meeting of ASME. Preparation of raw material is covered, and a physical description and case histories of parts made from material are treated. Booklet may be obtained by writing to Marketing Services Department, Disogrin Industries, Inc., 510 South Fulton Ave., Mount Vernon, N. Y.

Check 1477 opposite last page.

Heating and ventilating units are depicted in 20-page bulletin including capacity tables, air-resistance charts, and rpm and hp tables. Bul 910 — American Air Filter Company, 215 Central Avenue, Louisville 8, Ky.

Check 1478 opposite last page.

Training school for instrument engineers is described in bulletin. Five courses, including telemetering, are offered regularly; special courses as need occurs. "Training School" — The Bristol Co., Waterbury 20, Conn.

Check 1479 opposite last page.

Laboratory glassware is detailed in 12-page catalog and price list. Technical and physical data are given. "Vycor® Laboratory Glassware" may be obtained from Burrell Corporation, 2223 Fifth Ave., Pittsburgh 19, Pa.

Check 1480 opposite last page.

Automatic batching for many types of operations are described in eight-page brochure. Form 2964 — Toledo Scale, Division of Toledo Scale Corporation, Toledo 12, Ohio.

Check 1481 opposite last page.

Storage racks reference library includes 24-page course of instruction, dealing with problem of racks, design and construction, and case histories. Beam-load capacitities are included. Storage Rack Bul—Tube-Strut Corp., 2960 Marsh St., Los Angeles 39, Calif.

Check 1482 opposite last page.

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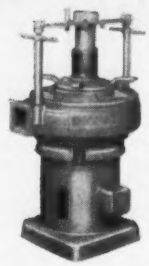
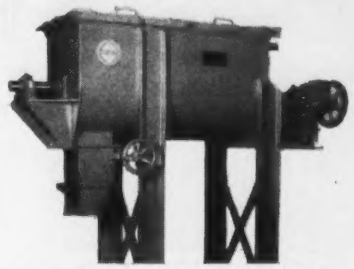
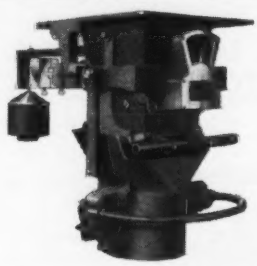
The Right Place to Look
FOR A BETTER BUY



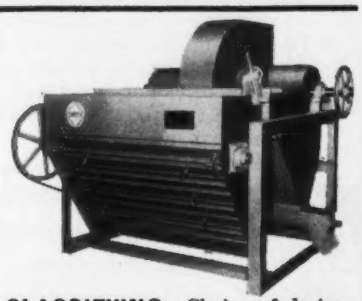
SIZING – New clean cut sizing at high speed without heat. Trial runs arranged in our plant.



MIXING – 30 mixers, horizontal and vertical. Mixall and Sanimix in Stainless, and Standard.

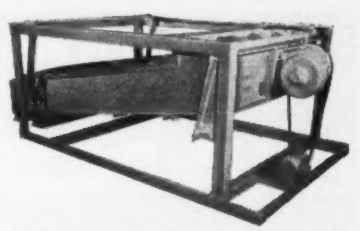


WEIGHING – Portable bagging scales and accessories. 2 models—weigh 25 to 200 lbs. Also packers.



CLASSIFYING – Choice of designs and models in a variety of sizes for individual requirements.

CONVEYING – Bucket elevators, screw and belt conveyors to individual installation requirements.



SCREENING – Vibratory closed-circuit rapid uniform screening. 7 sizes in single or double deck models.

EUREKA EQUIPMENT DOES SO MUCH—
SO LONG—FOR SO LITTLE

Each unit expertly designed, precisely built to deliver efficient, durable service... alone or in combination with other EUREKA units. Wide selection of standard models in a variety of sizes and capacities or custom built to exact specifications. Your request for information or quotations will receive prompt, personal attention.

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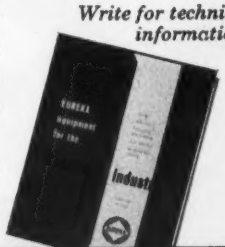

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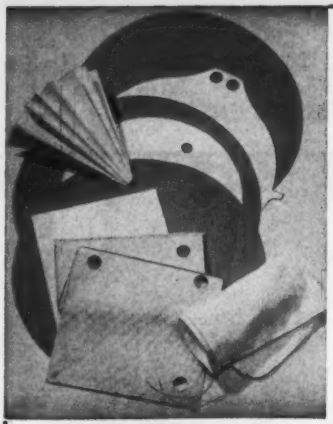

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Specialists in metering pumps and lubricators since 1898

Check 1485 opposite last page

NEW LITERATURE

Ultrasonics—series of data sheets describes ultrasonic systems for application in chemical processing, and cleaning of ceramics, radioactive elements and other parts. Series 5000—Narda Ultrasonics Corp., 626 Main St., Westbury, L.I., N.Y.

Check 1486 opposite last page.

Cooling coils for chilled water are described in two-page bulletin. Standard coils and ratings are shown. Bul CWC-200—Halstead & Mitchell, Bessemer Building, Pittsburgh 22, Pa.

Check 1487 opposite last page.

Theory of mixing and comparison of different types of mixing equipment are subject of bulletin. Tables to assist in the selection of mixer size for specific applications are included. Bul 730—Infilco Inc., Tucson, Arizona.

Check 1488 opposite last page.

Pump-stroke controller that operates in direct response to 3-15-psig air signal and requires no additional source of supply air is described in two-page Tech Information Bul 304 — Hills-McCanna Co., 4572 W. Touhy Ave., Chicago, Illinois.

Check 1489 opposite last page.

Nuclear power—105-page bibliography of studies pertaining to merchant ship propulsion is available. Bul ASAE-S-10 may be obtined by sending $2.50 direct to Office of Technical Services, Dept. of Commerce, Washington 25, D.C.

Fatty acid products' specifications and characteristics are detailed in revised brochure of four pages. "Specifications and Characteristics of Fatty Acids"—Dept. 5, Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio.

Check 1490 opposite last page.

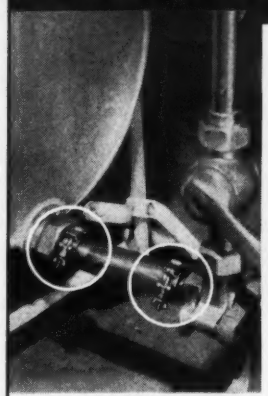
Printing on corrugated is reviewed in 30-page booklet. Every phase is explored. Booklet LPL 8—Hinde & Dauch, Division of West Virginia Pulp and Paper Company, Sandusky, Ohio.

Check 1491 opposite last page.

Antioxidants are described in 12-page booklet which features a discussion of oxidation mechanism through free radical action. Applications in various fields are given. Also included are documented laboratory data on physical and chemical properties. "Catalin Antioxidants"—Catalin Corporation of America, One Park Ave., New York 16, N. Y.

Check 1492 opposite last page.

MARMAN Sanitary Hose Clamps
Connect Processing Lines Quickly



Stainless steel Marman Sanitary Hose Clamps assure positive, leak-proof connection of processing lines in dairies, food processing and chemical plants. Completely corrosion resistant, the wide band adjusts easily to hose size, won't cut into plastic or rubber hose. Choice of quick coupler or toggle latch. Sizes for 1¼" to 3½" hose.

7310 Clamp with quick coupler latch.

7320 Clamp with toggle latch.

Sanitary Hose Clamps hold Tygon hose on milk dump tank, disconnect quickly for cleaning.

MARMAN DIVISION
Aeroquip Corporation
INDUSTRIAL SALES DEPARTMENT
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IN CANADA: AEROQUIP (CANADA) LTD., TORONTO 19, ONTARIO
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For chemical plant uses, on all studs and bolts exposed to temperatures up to 1800°F. such as on compressor head assemblies, hot pump studs, autoclaves, reactor flange studs, heaters, heat exchangers, "cat" crackers, stainless steel assembly.

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C-5's exclusive colloidal copper formula separates mating metal threads and surfaces with cushioning, protective copper plating. C-5 prevents galvanic action and eliminates pitting even when dissimilar metals join. On mating metal surfaces, C-5 saves gaskets and countless man hours.

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Chicago 80, Ill.

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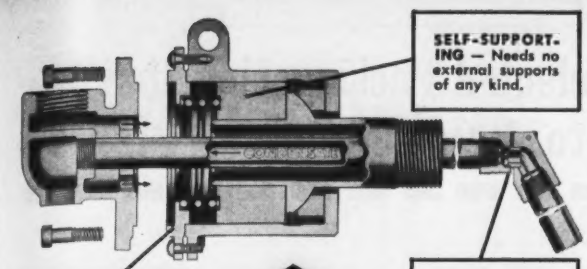
SELF-SUPPORTING — Needs no external supports of any kind.
ASSEMBLY PLATE — Holds internal parts in position when head is removed.
SYPHON ELBOW — Permits use of straight pipe for syphon. Can be inserted or withdrawn right through the joint.

Johnson Rotary Joint with SYPHON ELBOW

Johnson Joints represent the best way industry has yet found to get steam or liquids into rotating rolls and cylinders. They are completely packless, need no lubrication or adjustment. The Type SBP shown gets steam in, condensate out, through the same head. Other types available for through flow service, in sizes to meet all operating needs. ***WRITE FOR COMPLETE INFORMATION.***

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NEW LITERATURE

Sight flow indicators and check valves are described in two specification sheets. Materials of construction, operational limits, and standard models are given. Subjects are covered in sequence in Specification Flyers 10E1200 and 10E1215—Fischer & Porter Co., 842 Jacksonville Rd., Hatboro, Pennsylvania.

Check 1497 opposite last page.

Acrylic ester resins for coatings are described in 16-page booklet. Tables cover properties and compatibilities. Details are given on such formulations as adhesives, enamels, luminous paints. Bul C-46-58—Resinous Products Division, Rohm & Haas Company, Washington Square, Philadelphia 5, Pennsylvania.

Check 1498 opposite last page.

Manometers of various types and for different applications are described in 24-page catalog. Also covered are indicating liquids and accessories. Cat 2008—King Engineering Corporation, 415 Detroit St., Ann Arbor, Mich.

Check 1499 opposite last page.

Centrifugals are treated in bulletin. Information includes description of centrifugal which achieves 1600 rpm, 1750 G's. Centrifugal Bul—Centrifugal Division, The Fletcher Works, Inc., 201 Glenwood Ave., Philadelphia 40, Pa.

Check 1500 opposite last page.

Air compressors are discussed in four-color, 12-page bulletin. Component parts and accessories are explained. Bul SG-2—Sales Promotion Dept., Le Roi Div., Westinghouse Air Brake Co., Milwaukee 1, Wis.

Check 1501 opposite last page.

Silicone paper coatings are described in four-page booklet. Savings in time and costs resulting from use of anti-adhesive materials are pointed up. Bul 8-602—Dow Corning Corporation, Midland, Michigan.

Check 1502 opposite last page.

Control-panel information system accessories are listed in four-page Bul 104 — Panellit, Inc., 7401 North Hamlin Avenue, Skokie, Ill.

Check 1503 opposite last page.

Pocket-size guide detailing uses of sodium bisulfite is available. Weights of 24 industrial chemicals are also listed. "Use Guide for Sodium Bisulfite" — Inorganic Chemicals Division, Monsanto Chemical Co., St. Louis 24, Mo.

Check 1504 opposite last page.

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. . . the answer to your CONVEYOR AND ELEVATOR problems . . .

Whatever the materials to be handled . . . the need for rugged, reliable, equipment . . . installation space limitations . . . MECO can supply the answer with Conveyors and Elevators, designed, engineered, and manufactured, *to meet your specific requirements!* MECO Conveyors and Elevators embody features and advantages gained in nearly 50 years of experience in the manufacture of material handling equipment—assure efficient, economical operation, and years of trouble-free service—are giving the utmost in satisfaction to numerous users in the chemical, plastics, ceramics, coal, sand and gravel, non-metallic and other industries.

MECO Centrifugal discharge Elevator, feeding conveyor.

MECO Conveyor with hopper and chute for material blending.

For additional information, write today for Bulletins No. 576 & No. 577. Literature mailed promptly. For immediate action, call collect!

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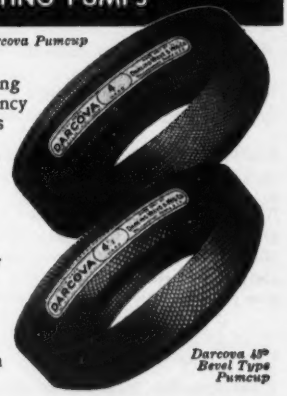
DARCOVA PUMCUPS
now available with
100% NYLON COMPOSITION
for HYDRAULIC CONTROLS, AIR CYLINDERS, RECIPROCATING PUMPS

Darcova Pumcup



DARCOVA PUMCUPS—long noted for unequalled efficiency and life in all kinds of cylinders—are now greatly exceeding their own performance records! The new 100% Nylon Composition, available *only* in Darcova Pumcups, does it!

Nylon Pumcups are made in sizes, types and textures exactly right for your particular equipment—ready *now* to give you unprecedented piston packing performance!

Write for helpful data Bulletin No. 5503.

Darcova 45° Bevel Type Pumcup

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

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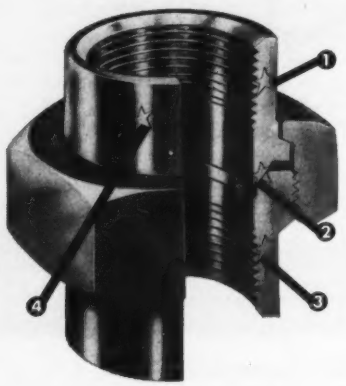
PUMCUPS

Check 1506 opposite last page

only
CATAWISSA
gives you all these features for your forged steel pipe union requirements



1. **Uniform walls** for even expansion and contraction under temperature changes. They follow the pipe!

2. **Catawissa Ball-to-Angle Seats** give you a "Perfect Seal" regardless of pipe alignment!

3. **More than adequate** wall thicknesses give you Catawissa's 3-to-1 Safety Factor (3000-lb. service, 9000-lb. test; 6000-lb. service, 18000-lb. test)!

4. **Round, straight barrels** for fast wrenching. No uneven or tapered surfaces to cause wrench slips or wrench locking!

Catawissa Perfect Seal Pipe Unions are made by Union Specialists from 80,000 lb. tensile strength steel (ASTM Spec. A-105-55T, Grade II). Steel forgings from our own forging mill are closely checked for imperfections . . . and finishing on modern, automatic machines with close inspection during and after production give you pipe unions second to none!

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Check 1507 opposite last page

NEW LITERATURE

Motor pumps in 20 sizes are described in 18-page bulletin including drawings, selection charts, friction tables, and a sample pump work sheet. Form 70022 — Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Check 1508 opposite last page.

Turbine-type mixers are cataloged in bulletin. Intensive mixers are fully described in General Turbomixer Bul — Process Equipment Division, General American Transportation Corporation, 135 S. LaSalle St., Chicago 90, Ill.

Check 1509 opposite last page.

Pressure recorders and elements, recording charts and planimeters, temperature recorders and elements, and recording orifice meters with temperature-recording element are covered in series of bulletins. The following bulletins cover the above subjects in sequence —400, 407, 408, and 409. All may be obtained from American Meter Company, 920 Payne Ave., Erie, Pennsylvania.

Check 1510 opposite last page.

Russian water treatment technology and how it compares with that of the United States and Eastern Europe is subject of technical paper. Tech Reprint T-167—Graver Water Conditioning Co., 216 W. 14th St., New York 11, New York.

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Fused salts research conducted in Russia has been translated into English. Table of contents listing 42 papers is available free of charge. Total price of papers is $40.00. Table of contents, Soviet Research in Fused Salts—Consultants Bureau, Inc., 227 West 17th St., New York 11, N.Y.

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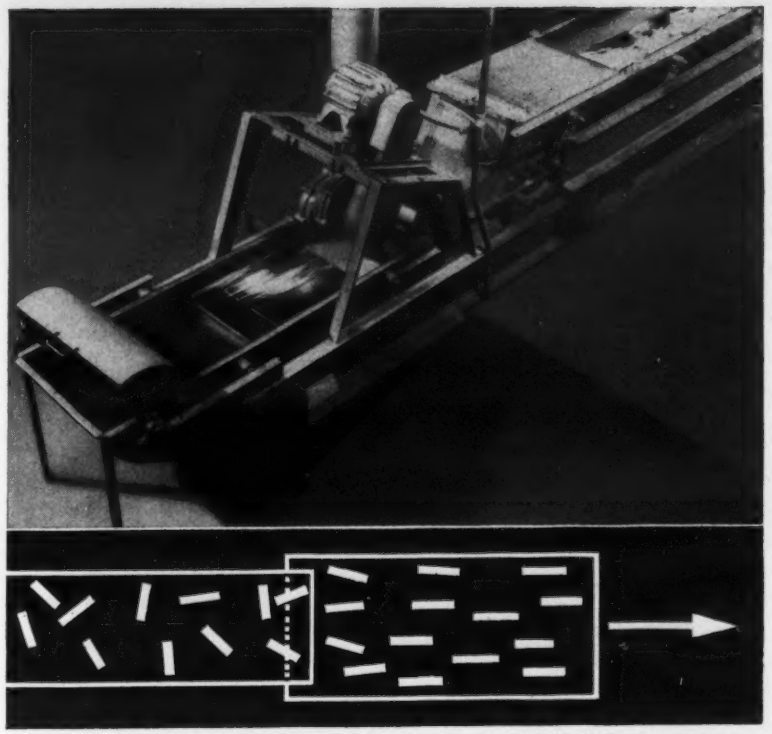

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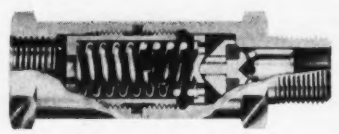

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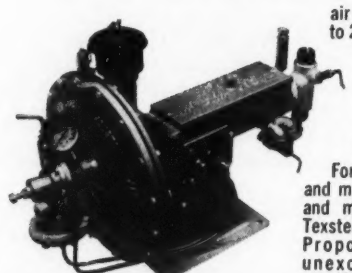

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☐ 1031*	☐ 1076	☐ 1121	☐ 1166	☐ 1211	☐ 1257
☐ 1032	☐ 1077	☐ 1122	☐ 1167	☐ 1212	☐ 1258
☐ 1033	☐ 1078	☐ 1123	☐ 1168	☐ 1213	☐ 1259
☐ 1034	☐ 1079	☐ 1124	☐ 1169	☐ 1214	☐ 1260
☐ 1035	☐ 1080*	☐ 1125	☐ 1170	☐ 1215	☐ 1261
☐ 1036	☐ 1081	☐ 1126	☐ 1171	☐ 1216	☐ 1262
☐ 1037	☐ 1082	☐ 1127	☐ 1172	☐ 1217	☐ 1263*
☐ 1038*	☐ 1083*	☐ 1128	☐ 1173	☐ 1218	☐ 1264
☐ 1039	☐ 1084	☐ 1129	☐ 1174	☐ 1219	☐ 1265
☐ 1040	☐ 1085	☐ 1130	☐ 1175	☐ 1220	☐ 1266
☐ 1041	☐ 1086	☐ 1131	☐ 1176	☐ 1221*	☐ 1267
☐ 1042	☐ 1087	☐ 1132	☐ 1177	☐ 1222	☐ 1268
☐ 1043	☐ 1088*	☐ 1133	☐ 1178	☐ 1223*	☐ 1269
☐ 1044	☐ 1089	☐ 1134	☐ 1179	☐ 1224	

Use this space for writing in specific literature or product designation when you check a number with an asterisk (*) in accompanying list. Repeat the key number from that list, and follow it with specific bulletin number (or title), or product name, as it appears in article or advertisement. PLEASE TYPE OR PRINT.

Key No.	Description

☐ 1270	☐ 1311	☐ 1354	☐ 1397	☐ 1440	☐ 1483
☐ 1271	☐ 1312	☐ 1355	☐ 1398	☐ 1441	☐ 1484
☐ 1272	☐ 1313	☐ 1356	☐ 1399	☐ 1442	☐ 1485
☐ 1273	☐ 1314	☐ 1357	☐ 1400	☐ 1443	☐ 1486
☐ 1274	☐ 1315	☐ 1358	☐ 1401	☐ 1444	☐ 1487
☐ 1275	☐ 1316	☐ 1359	☐ 1402	☐ 1445	☐ 1488
☐ 1276	☐ 1317	☐ 1360	☐ 1403	☐ 1446	☐ 1489
☐ 1277	☐ 1318	☐ 1361	☐ 1404*	☐ 1447	☐ 1490
☐ 1278	☐ 1319	☐ 1362	☐ 1405	☐ 1448	☐ 1491
☐ 1279	☐ 1320	☐ 1363	☐ 1406	☐ 1449	☐ 1492
☐ 1280	☐ 1321	☐ 1364	☐ 1407	☐ 1450	☐ 1493
☐ 1281	☐ 1322	☐ 1365	☐ 1408	☐ 1451	☐ 1494
☐ 1282	☐ 1323	☐ 1366	☐ 1409	☐ 1452	☐ 1495
☐ 1283	☐ 1324	☐ 1367	☐ 1410	☐ 1453	☐ 1496
☐ 1284	☐ 1325	☐ 1368	☐ 1411	☐ 1454	☐ 1497*
☐ 1285	☐ 1326	☐ 1369	☐ 1412	☐ 1455	☐ 1498
☐ 1286	☐ 1327	☐ 1370	☐ 1413	☐ 1456	☐ 1499
☐ 1287	☐ 1328	☐ 1371*	☐ 1414	☐ 1457	☐ 1500
☐ 1288	☐ 1329	☐ 1372	☐ 1415	☐ 1458	☐ 1501
☐ 1289	☐ 1330	☐ 1373	☐ 1416	☐ 1459	☐ 1502
☐ 1290	☐ 1331	☐ 1374	☐ 1417	☐ 1460	☐ 1503
☐ 1291	☐ 1332	☐ 1375	☐ 1418	☐ 1461	☐ 1504
☐ 1291A*	☐ 1333	☐ 1376	☐ 1419	☐ 1462	☐ 1505
☐ 1291B	☐ 1334	☐ 1377	☐ 1420	☐ 1463	☐ 1506
☐ 1292	☐ 1335	☐ 1378	☐ 1421	☐ 1464	☐ 1507
☐ 1293	☐ 1336	☐ 1379	☐ 1422	☐ 1465	☐ 1508
☐ 1294	☐ 1337	☐ 1380	☐ 1423	☐ 1466	☐ 1509
☐ 1295	☐ 1338	☐ 1381	☐ 1424	☐ 1467	☐ 1510*
☐ 1296	☐ 1339	☐ 1382	☐ 1425	☐ 1468	☐ 1511
☐ 1297	☐ 1340	☐ 1383	☐ 1426	☐ 1469	☐ 1512
☐ 1298	☐ 1341	☐ 1384	☐ 1427	☐ 1470	☐ 1513
☐ 1299*	☐ 1342	☐ 1385	☐ 1428	☐ 1471	☐ 1514
☐ 1300	☐ 1343	☐ 1386	☐ 1429	☐ 1472	☐ 1515
☐ 1301	☐ 1344	☐ 1387	☐ 1430	☐ 1473	☐ 1516
☐ 1302	☐ 1345	☐ 1388	☐ 1431	☐ 1474	☐ 1517
☐ 1303	☐ 1346	☐ 1389	☐ 1432	☐ 1475	☐ 1518
☐ 1304	☐ 1347	☐ 1390	☐ 1433	☐ 1476	☐ 1519
☐ 1305	☐ 1348	☐ 1391	☐ 1434	☐ 1477	☐ 1520
☐ 1306	☐ 1349	☐ 1392	☐ 1435	☐ 1478	☐ 1521
☐ 1307	☐ 1350	☐ 1393	☐ 1436	☐ 1479	☐ 1522
☐ 1308	☐ 1351	☐ 1394	☐ 1437	☐ 1480	
☐ 1309	☐ 1352	☐ 1395	☐ 1438*	☐ 1481	
☐ 1310*	☐ 1353*	☐ 1396	☐ 1439	☐ 1482	

Be Sure To Give Your Address

*On all numbers having an asterisk (*) after them, please identify the exact product or piece of literature in one of the blank columns on this and front page. Write in the key number, as given on the slip, followed by the bulletin number (or title), or name of product in which you are interested.

Use this space for writing in specific literature or product designation when you check a number with an asterisk (*) in accompanying list. Repeat the key number from that list, and follow it with specific bulletin number (or title), or product name, as it appears in article or advertisement. PLEASE TYPE OR PRINT.

Key No.	Description

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Name ..... Title .....

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Street Address of Company .....

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Converter muffles fumes; cuts smog irritation

In its search for an effective catalytic converter system, the Ford Motor Company's Engineering Research Office developed a catalytic converter for incorporation in the auto muffler. Depending upon driving conditions, the converter eliminates from 60 to 73 percent of exhaust hydrocarbons. Vanadium pentoxide catalyst was found to be the most promising of more than 100 catalytic agents involved in the research program. Catalyst life currently is estimated to be from 10,000 to 12,000 miles, and cost would be approximately $150 installed.

Nylon cylinder record size

The Polymer Corporation, Reading, Pa., has produced what is reported to be the largest monolithic nylon shape ever manufactured. The cylinder, over 21′ long and weighing over 700 lb, has an outside diameter of 16″ and a 13″ inside diameter. The giant cylinder is intended primarily for use as a roller covering to impart nylon's abrasion resistance, resilience, and surface characteristics to these applications. Cylinders up to 48″ in outside diameter can be produced by the same process.

Chemical pied pipers, cow tranquilizers!!

According to Dr. Max T. Goebel, research director for Du Pont Company's Grasselli Chemicals Department, chemical pied pipers that will lure insects away from their destructive work are one of the possibilities for future agricultural chemicals development.

The promotion of livestock growth with tranquilizers and combatting vagaries of weather and climate by chemical control of normal growth processes of crops were other possibilities suggested by Dr. Goebel — perhaps to be realized within two decades.

REG. U. S. PAT. OFF.

Enter now... SCOTCH BRAND TAPES

TAPE-O-RAMA

135 FABULOUS PRIZES

FIVE 1st PRIZES*

Westinghouse Dream Kitchens

or alternate Westinghouse equipment of equal value

EACH KITCHEN INCLUDES:

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20 2nd PRIZES: Choice of refrigerators, ranges or Laundromats

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25 4th PRIZES: Portable television sets

30 5th PRIZES: Transistor radios

30 6th PRIZES: Choice of electric blankets or portable mixers

*3M will pay up to $300 installation charges on all first prize awards.

MANUFACTURING PERSONNEL...

Easy to enter...easy to win!

Contest open to all personnel of manufacturing plants within the continental limits of the U.S.A., except employees of Minnesota Mining & Mfg. Co., their subsidiaries, their advertising agencies and their families. Entries must describe a new non-electrical usage for "SCOTCH" BRAND Industrial Tapes and/or dispensing equipment which is initiated in the entrant's plant during the TAPE-O-RAMA contest period, February 1, 1959 to June 30, 1959. Winners will be determined on the basis of benefits derived by entrant's plant, and the industry of which that plant is a part.

HURRY—*Get your official entry blank and details from your "SCOTCH" BRAND Tape Distributor or 3M Representative. Use coupon below to request his call, or contact him direct.*

TAPE-O-RAMA CONTEST Dept. GJP, 900 Bush Avenue, St. Paul 6, Minnesota

Name_____

Job_____

Company_____

Company Address_____

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"SCOTCH" IS A REGISTERED TRADEMARK FOR THE PRESSURE-SENSITIVE ADHESIVE TAPES OF 3M CO., ST. PAUL 6, MINN. EXPORT: 99 PARK AVE., NEW YORK 16, N.Y. CANADA: LONDON, ONTARIO.

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...WHERE RESEARCH IS THE KEY TO TOMORROW

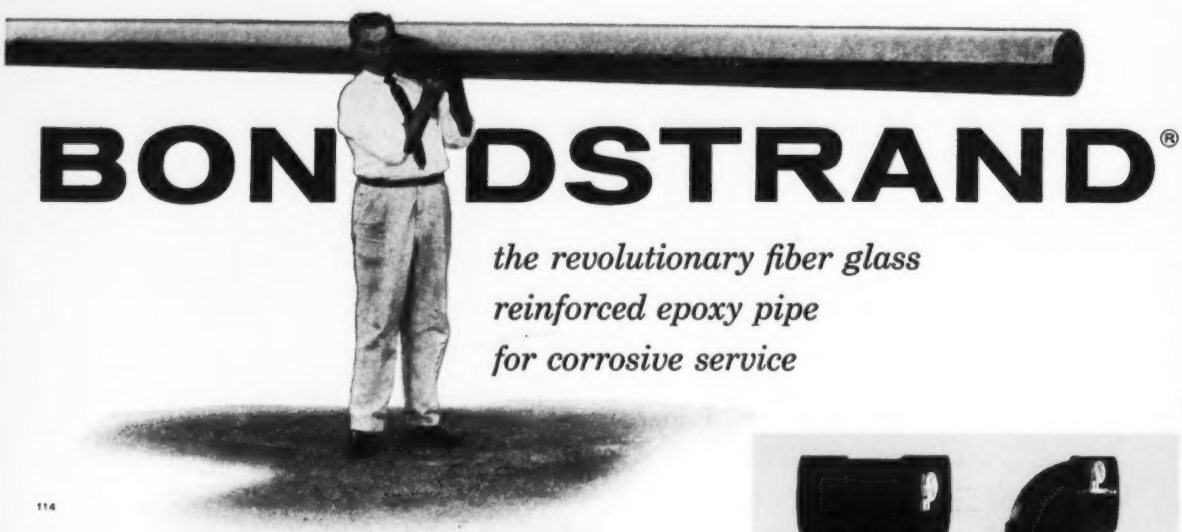
3M COMPANY

Check 1521 opposite last page

STRONG as steel pipe

...at one-eighth the weight!

Circumferential Tensile Strength... 80,000 psi



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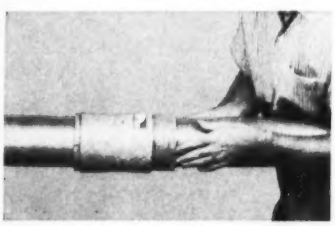
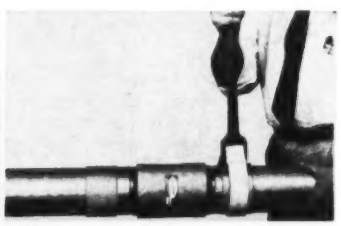
the revolutionary fiber glass reinforced epoxy pipe for corrosive service

114

Here's a pipe that holds up indefinitely under the corrosive action of many salt, acid and alkaline solutions... that can't contaminate or flavor the piped material... that is rigid enough to resist sag, cold flow or deformation – flexible enough to follow normal ditch contours... that remains smooth and unclogged throughout its entire service life... that won't leak, even near its burst pressure.

Easy to install, with choice of locking wedge or threaded fittings.





Simple instructions with each shipment insure a perfect joint on the first try.

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This means that you can use BONDSTRAND to transport corrosive solutions, waste water, sewage, oils, foods, beverages and many other troublesome fluids. It's also ideal for ducting, conduit or handrails where corrosive atmospheres, condensation, spillage or immersion cause troubles with ordinary pipe.

Check 1522 opposite last page

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